FEBRUARY 13, 1956

# STEEL
## The Metalworking Weekly

A PENTON PUBLICATION

A PROGRAM FOR MANAGEMENT IN 1956 . . No. 1

# It's Time To Grow . . .

## Why, How and Where

—page 81

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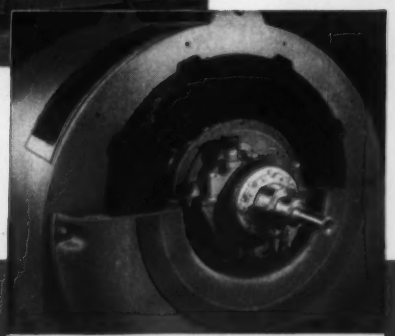
**ALLIS-CHALMERS**
Wound-Rotor and Synchronous
**MOTORS**

Shown is a 400-hp, 900-rpm end-shield bearing synchronous motor. Other Allis-Chalmers motors of this design are available from 250 hp at 300 rpm and up, in drip-proof and splash-proof construction.

# Now full protection without loss of accessibility

**All parts, including slip rings and leads, are enclosed — yet removable inspection covers and end-shield sections simplify maintenance.**



Note accessibility offered by generous size opening covers. Upper half of end shield is removable for entrance to motor winding.

These motors combine modern functional design with maximum protection and accessibility.

*Here are some of the important features:*

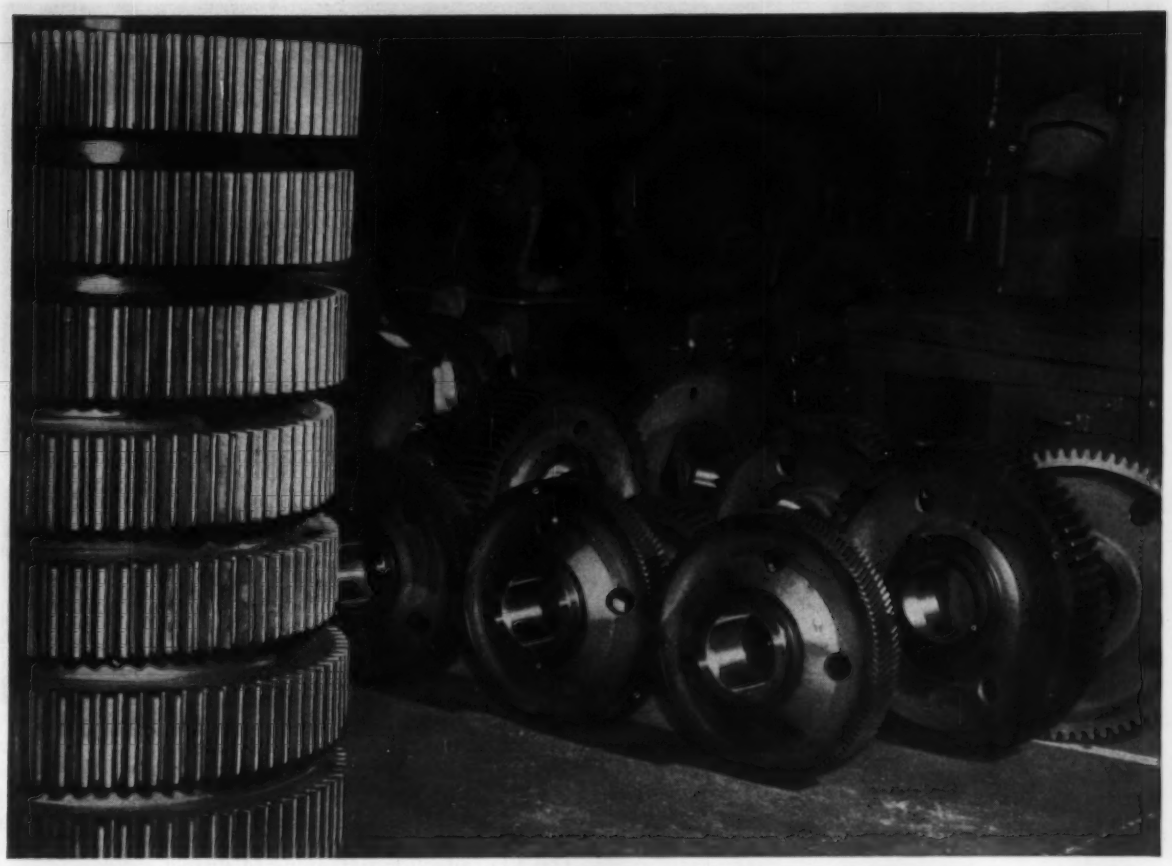
- Collectors and brushes are protected by box-type stator yoke from physical damage, dripping moisture, dust and dirt.
- Cast end shields provide rigid bearing support and full protection for motor windings.
- Slip-ring leads are brought out to a terminal box — they are not left exposed.
- Capsule-type sleeve bearings permit inspection or cleaning of motor windings without exposing interior of bearing to dirt.
- Access covers are secured by easy-operating, self-locking fasteners for ready removal.

Get details — Call your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 05R8183.

A-C ALLIS-CHALMERS

# ALLIS-CHALMERS

A-4847



# The gear shop can be proud of these

To the shopman, few things are prettier than a well-machined gear — unless it's a whole inventory of well-machined gears. The stock above is a good example.

Here the beauty is more than skin-deep. The gears are as strong and tough as human skills can make them. All these gears were machined from Bethlehem blanks, which meant that they started with every advantage.

After all, the basis of any good gear is a good, sound blank. And you are certain of top-flight blanks when you get them from Bethlehem. For, at the Bethlehem shops, a special process has been developed for the making of gear blanks; a process that assures high strength, uniform grain flow, and excellent surface texture.

This method of manufacture is unique. It employs the only mill of its kind in the country . . . a mill that upsets, forges, and rolls the steel in a single operation. Let's stress that point. The blank is not just forged, not just rolled, but *both* . . . and both are important to the quality of the finished piece.

You're interested in quality, we know. So specify Bethlehem blanks for your spur, bevel, miter, helical, and other types of gears. You'll find these blanks equally good for crane wheels, industrial wheels, turbine rotors, clutch and brake drums, sheave wheels, flywheels, etc. They are available in sizes from 10 to 42 in. OD.

For additional information, ask us to send you Booklet 216. It is crammed with pictures and interesting data. No charge, of course; just drop us a card.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

**BETHLEHEM STEEL**

BETHLEHEM STEEL

# Former Heat-Treating Time—28¼ HOURS
# TOCCO Heat-Treating Time—30 MINUTES

Plus

**$108 saved on every mill roll**

This special mill roll hardening fixture is powered by two 200 KW, 3000 cycle TOCCO machines. Mill roll shown is 12" diameter by approx. 60" long.

# with TOCCO* Induction Heating

When progressive engineers at The McKay Machine Company switched from conventional heat-treating methods to TOCCO induction hardening of their mill rolls, they achieved not only increased production but also important cost savings, and perhaps most important of all, a greatly improved product.

## 56 Times as Fast!

Formerly mill rolls required a 12-hour heat, a 15-minute salt brine quench, 12 hours tempering and a 4-hour cooling period. With TOCCO the whole job is done—and done better—in just 30 minutes—56 times as fast!

## Here's Real Economy

Reduced furnace time saves $28.00 per roll. More important, grinding time is cut in half (saving $80 per roll) because TOCCO minimizes distortion and there's less stock that must be removed. Runoff used to be as much as ¼"—frequently requiring a separate straightening operation.

## Product Improved

Because TOCCO "scans" the mill roll, i.e. heat treats it progressively, only a small section is at critical temperature at any one time. That's why distortion is minimized and little finish grinding is required. This means that TOCCO-hardened mill rolls have a *more uniform case-hardened depth* than possible with old fashioned methods which in turn means longer life and better performance.

• • •

Why not have a TOCCO engineer survey your plant to determine where TOCCO can reduce your costs, increase production speed and improve product quality?

**THE OHIO CRANKSHAFT COMPANY**

**TOCCO**

*Mail Coupon Today*

**NEW FREE BULLETIN**

THE OHIO CRANKSHAFT CO.
Dept. S-2, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____

# BAKER "FG"
# — a new concept in gas truck construction —
# "BALANCED DESIGN"

**Here's how the Baker FG gas fork truck—"first in its class"—was conceived:**

***First:*** Exact requirements for a specific truck in the FG line were thoroughly analyzed. Then our engineers, working with a top manufacturer of heavy-duty industrial gas engines, chose the power plant specifically to meet these requirements. Even internal parts of the engine were balanced. For example, our specifications call for pistons balanced to ± 2 grams instead of the conventional ± 2 ounces.

***Next:*** Transmission was selected to match the power plant and geared to provide required speeds and acceleration. In conjunction with the largest builder of axles in the country, the drive axle was developed to match power plant and transmission.

Lifting mechanism was selected to meet requirements and to be coordinated with power train and other components. *Mast* was engineered for the maximum safe lift, within the stability ratio of the frame which was designed for exceptionally low center of gravity. The standard Baker wide-angle steer, rubber mounted, trailing axle was modified to match the other elements.

***Result:*** 100% Balanced Design
—another Baker "First".

Baker "FG" gas fork trucks are available with 3,000, 4,000, 5,000 and 6,000 pound capacities. Specific bulletins can be obtained by writing The Baker-Raulang Company, 1259 West 80th Street, Cleveland 2, Ohio.

A Subsidiary of Otis Elevator Co.

Baker®
handling equipment

## 8 REASONS WHY THE BAKER FG FORK TRUCK IS FIRST IN ITS CLASS...

**1. LOWER INITIAL COST**
Costs considerably less than other trucks in its class.

**2. LONGER WARRANTY PERIOD**
Baker quality permits full 6 months' warranty.

**3. HIGHER LIFT**
Mast design allows higher standard lift than ordinary trucks.

**4. LOWER MAINTENANCE COSTS**
Designed for easier and less frequent servicing.

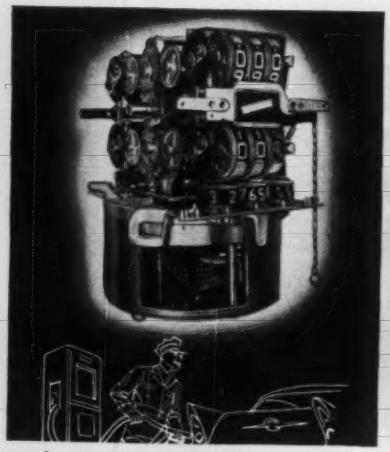
**5. MORE MANEUVERABLE**
Short turning radius cuts aisle width, adds floor space.

**6. EASIER TO OPERATE**
Greater visibility . . . easy-to-work controls.

**7. GREATER STABILITY**
Lower center of gravity . . . higher "stability factor" ratio.

**8. BETTER BRAKING**
Full floating, self-equalizing, self-energizing brakes.

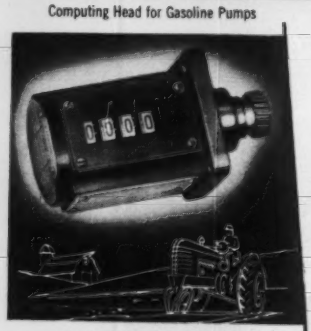
5G1



Computing Head for Gasoline Pumps

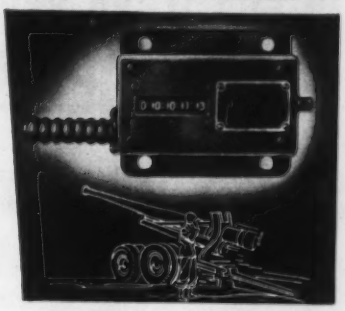
"Master Meter Duplicator" prints receipts for fuel oil delivered from trucks

"Vary-Tally" Multi-Unit Reset Manual Counter

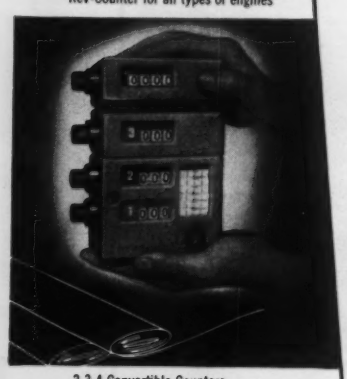


Rev-Counter for all types of engines

# Everyone Can Count on VEEDER-ROOT



Recoil Counter for new 280 mm atomic cannon

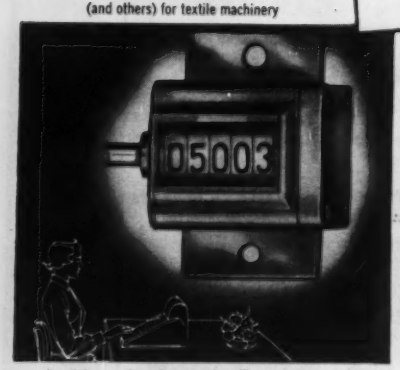


2-3-4 Convertible Counters (and others) for textile machinery

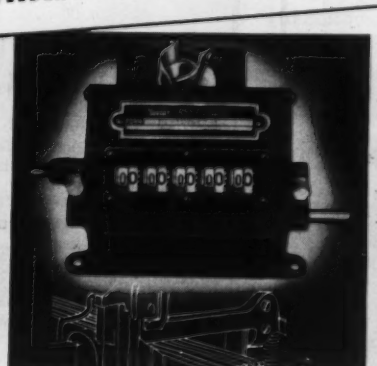
Everywhere you look in everyday life, you see a familiar face . . . the face of a Veeder-Root Counter or Computer. From gasoline pumps to fuel oil trucks to textile mills . . . in the home, on the farm, in business and commerce, in modern automated industry . . . Veeder-Root standard and special devices are keeping everything under *Count*rol . . . manually, mechanically, electrically. And the mathematical probabilities are mighty high that *you* can count on Veeder-Root, too . . . to your advantage and profit. Why not let us figure out how, *right now*?

**VEEDER-ROOT INC. • HARTFORD 2, CONN.**

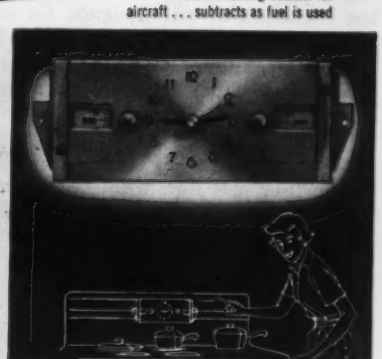
Fuel-Remaining Counter for aircraft . . . subtracts as fuel is used



Small Square-Case Counters for office and other machines



Predetermining Counters for preventing short and over-runs on production machines



Range Timer . . . easy to read . . . easy to set

*STOCKS OF STANDARD COUNTERS AVAILABLE AT* — Greenville, S. C. • Chicago 6, Ill. • New York 19, N. Y. • Los Angeles • San Francisco
Montreal 2, Canada • Offices and Agents in Other Principal Cities

STEEL
The Metalworking Weekly

FEBRUARY 13, 1956
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Recipes for RELIABILITY

There's no guesswork in the production of Seymour nickel silver, phosphor bronze and brass. Every step in their manufacture is prescribed—in detail—in a master quality control manual which is "the law" throughout Seymour casting shops and mills.

This is another reason why Industry has come to rely on Seymour to deliver nonferrous metals which are uniform in quality, year in and year out.

**"Specify Seymour! You know it's good!"**

NICKEL SILVER
PHOSPHOR BRONZE
BRASS

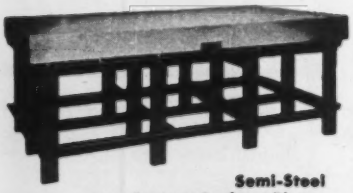
THE SEYMOUR MFG. CO.
SEYMOUR, CONN., U. S. A.

NOW TWO TYPES OF CHALLENGE SURFACE PLATES

NEW! CLOVIS BLACK GRANITE
Rated Class A.
Surface accuracy guaranteed.

FINE GRAIN SPECIAL ANALYSIS SEMI-STEEL
Precision ground or hand-scraped

STILL ONE STANDARD OF CHALLENGE QUALITY!



**Semi-Steel Layout Surface Plates**

High compressive strength . . . Low coefficient of expansion. 16 standard sizes, 6" thick — other sizes to order. Also available for sectional assembly into unlimited sizes.

**Cast-Iron Top Work Benches**

Four sizes, three styles. For individual use or on a continuous line. With self-contained storage facilities.

**Other Challenge Precision Products:**
Clamp Edge Layout Plates • Reading Tables • Lapping Plates • Welding Tables • Surface Plates • Bench Plates • Surface Plate Equipment.

See the full line of Challenge Clovis Black Granite and Semi-Steel Surface Plates in the new Challenge Catalog. Send for your free copy today!

786

Challenge®

THE CHALLENGE MACHINERY CO.
Office, Factories and Show Room:
GRAND HAVEN, MICH.

# behind the scenes

## The Switch Plate Switch

Roland J. Laboissonniere is manager of advertising and sales promotion at the American Screw Co., Willimantic, Conn. Cal Fisher represents STEEL in New England. Irwin H. Such is editor-in-chief of STEEL. George (Tiger) Farnsworth is a first-class commercial illustrator. That's the cast. Here's the story:

When the Dec. 19 issue of STEEL arrived on Mr. Laboissonniere's desk, Farnsworth's cover design on appliances captured his astonished attention because it featured an outlet plate with a *slotted* screw head. On page 152 of the same issue, the American Screw Co. carried a gigantic illustration of American Phillips Screws, including a sketch of a switch plate being deftly fastened with a couple of Phillips *recessed-head* screws.

Mr. Laboissonniere detached the cover, neatly replaced the illustration of the slotted screw with a Phillips screw, and mailed it to Cal Fisher with this note: "When do you suppose STEEL will catch up with the times?"

Fisher quickly mailed the note and attachment to the editorial department, where they came to the attention of Irwin Such, who immediately clapped on his hat and rushed out to do a bit of market research.

"We wrote Mr. Laboissonniere," said the editor-in-chief, "that we had looked about in some local stores without turning up any Phillips screws for electrical plates, but if he would send along a couple dozen, we would pass them around as reminders of a company doing an alert job of expanding its markets."

The screws arrived, and were duly passed around. Farnsworth gazed at his glumly. Tiger, tiger, burning bright, hadn't made the darn things right. "How was I to know," he groaned, "that there would be an ad in the same issue featuring American Phillips screws—on switch plates, yet!"

## Odds and Ends

A potpourri is generally understood to be a mess. So many interesting items have piled up begging for comment, we have decided to confess that authoring a potpourri comes natural, and here is this week's offering:

The U. S. Department of Agriculture tells us that the prolonged drouth, now in its sixth year in some western range areas, has kept grasses down, yet oddly enough has favored rapid increase of many kinds of range grasshoppers (grasslesshoppers?).

This excellent department is also working on studies to control and improve the flavor, color and texture of fruits and nuts. There is a temptation here to compare fruits and nuts with bureaucrats, but we will manfully resist, and go on with our potpourri. (It *does* sound better than mess, doesn't it?)

The National Bureau of Standards has devised a barium titanate jerkmeter for studying the action of the human heart. The instrument is (now hear this!) essentially a piezoelectric accelerometer with an output that is electrically differentiated. A jerkmeter! Possibilities here, eh?

The Packard Clipper Division of Studebaker-Packard Corp. has established a special engineering section to study automobile horn sounds. The company said a survey indicated that drivers respond to an auto horn blast as if they are being arbitrarily demanded to do something—rather than being politely asked in the interests of driving safety. Maybe the horn of the future will sound like distant muted bells, and we'll all be run over.

Secretary of Commerce Sinclair Weeks late in January received from Edward V. Lahey, president of the U. S. Brewers Foundation, and Thaddeus E. Alwyn, vice president of American Can Co.'s Atlantic Division, the nation's 50 billionth beer can. About how much beer do you suppose that would amount to, if it were poured into a hole in the ground and called Beer Lake?

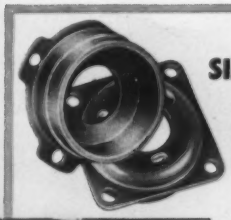
Shrdlu

(Metalworking Outlook—Page 35)

## CARBURIZING

**1** This is the operation for which the Leland salt bath was originally purchased. Work is heated at 1650° for 30 minutes, oil quenched and washed. A consistent, scale-free 0.005" case with surface hardness of $R_{15N}$ 75/80 is obtained.

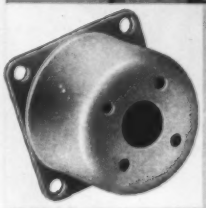
## SIMULTANEOUS BRAZING AND CARBURIZING



**2** Simultaneous brass brazing and carburizing cut cost from $79 to $13.11 per 1,000 parts, eliminated 3 handling operations, saved time. Average strength of brazed joints is 40,000 PSI. Case depth is 0.005"—0.007" with $R_{15N}$ 80/85 surface hardness.

## BRAZING

**3** Ajax Salt Bath brass brazing of this assembly reduced costs from $14.20 to $9.10 per thousand—without considering the reduction in rejects from 25% to less than 1% and elimination of 3 additional treatments previously needed with copper brazing.



## HARDENING

**4** SAE-1050 and 1065 cold rolled parts are hardened in the same Ajax bath used for the 3 other operations. Hardened parts will bend 45° before fracturing. The "pick-up" of a superficially carburized case is not objectionable.

# 4 Cost-Cutting Operations with One AJAX Salt Bath

## ...that saved $37,000 the first 8 months!

***Write for*** **details outlining the G. H. Leland Inc., multi-use operation of its Ajax salt bath.**

**Let Ajax engineers demonstrate similar heat treating savings. You get actual proof on your own work samples in the Ajax Metallurgical Service Laboratories. No cost or obligation.**

During its first 8 months on the job, this Ajax Electric Salt Bath Furnace saved $37,000 in the plant of G. H. Leland, Inc., Dayton, Ohio. This saving was figured after deducting *all* operating costs and 20% annual equipment depreciation!

Or, to put it another way, the amazing versatility of the Ajax furnace installation *enabled it to pay for itself in just a few months of use!*

Not only does the Salt Bath handle all four heat treating operations described and illustrated above . . . but the Leland model shop uses it for odd jobs as well.

Work is scale free. Distortion is no longer a problem . . and the firm's entire parts processing has been effectively streamlined.

**AJAX** HULTGREN **electric SALT BATH furnaces**

**AJAX ELECTRIC COMPANY**
952 Frankford Ave., Philadelphia 23, Pa.

*Associated Companies:* Ajax Electric Furnace Corp. • Ajax Electrothermic Corp. • Ajax Engineering Corp.

# *Fasten it with* STAINLESS STEEL

## *for Better Looks—Longer Life*

**LEADING PRODUCERS OF FASTENERS USE**

**AL STAINLESS**

A complete line of stainless steel fasteners—all types and sizes of bolts and nuts, rivets, wood and machine screws, cotter pins, washers, etc.—are made of AL Stainless Steel by the leading manufacturers in this field. Get in touch with them for catalogs and prices, or write us direct.

**ADDRESS DEPT. S-74**

AL Stainless Steel fasteners are non-rusting, non-staining. They will last as long as, or longer than, the materials they join. You can count on them to stand up through the years—both in strength and in bright good looks.

Best of all, stainless steel fasteners can be used anywhere. It isn't necessary that the materials to be joined are stainless—these corrosion-proof fasteners are the perfect answer for joining other metals, woods, or plastics. Fasteners made of AL Stainless by leading manufacturers are produced in complete variety—every type and size that your job requires.

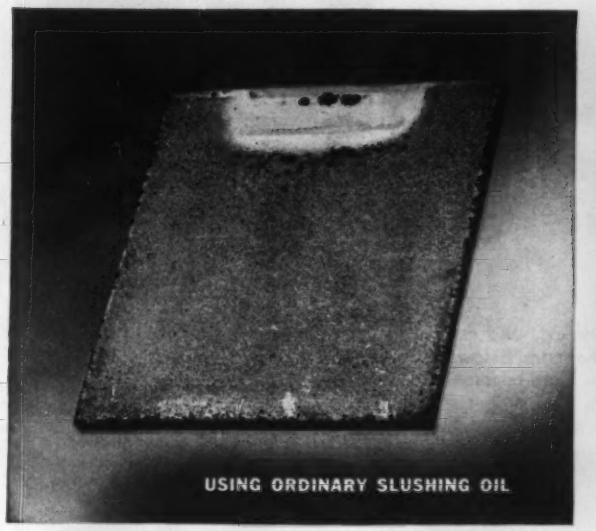
For improving quality and reliability wherever they're used—and for the economy of lifetime service—specify fasteners made of time-tested Allegheny Ludlum Stainless Steel. ● For fabricators' names and any technical data or engineering help in the use of stainless steel, address *Allegheny Ludlum Steel Corporation, Henry W. Oliver Bldg., Pittsburgh 22, Pa.*

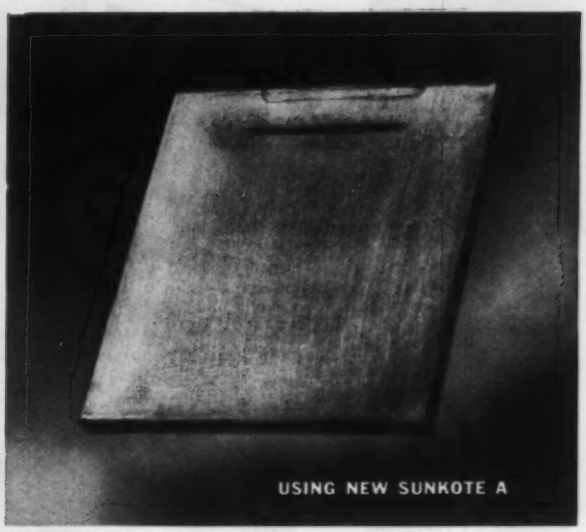
**Make it BETTER-and LONGER LASTING-with**

# AL Stainless Steel

AL ALLEGHENY LUDLUM

WAD 5865 **Warehouse stocks carried by all Ryerson Steel plants**




**Humidity Cabinet Test proves superiority of new coating oil.** Using ordinary slushing oil, steel test panel (on left) shows harmful rust after only 100 hours in humidity cabinet with relative humidity of 100% at 120 F. An identical steel test panel (above right), protected by new Sunkote A, shows no rust or stain whatsoever after 200 hours under same rust test conditions of high humidity and temperature.

# ANNOUNCING SUNKOTE A

## a new, low-cost rust preventive coating for hot and cold rolled strip and sheet steel

**SUNKOTE A is easily applied** by dip, roller, or spray. Special compounding provides extra protection against rust and stain at lowest cost.

Sunkote A is specifically compounded to protect hot-and-cold rolled strip and sheet steel against rust and stain for long periods in storage and in transit.

Economical to use, Sunkote A is moderately priced... gives maximum coverage and protection... can be applied by all usual methods... is easily removed by any of the normal cleaning processes.

For complete information about this new product, see your Sun representative...or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-2.

SUNOCO®

**INDUSTRIAL PRODUCTS DEPARTMENT**

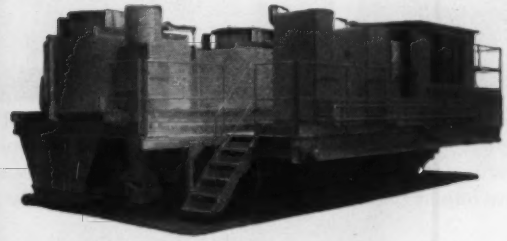
**SUN OIL COMPANY** Philadelphia 3, Pa.

**IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL**

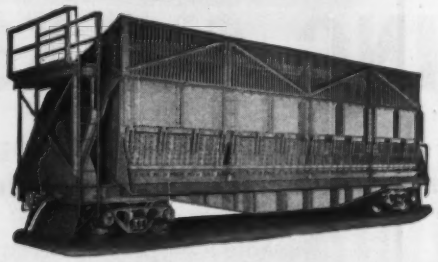
# COAL TO COKE VIA ATLAS CARS

Making coke is a specialized business, and requires special equipment like the cars below. Coke plant operators prefer Atlas Cars because they are dependable.

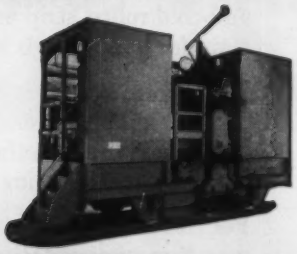
3 HOPPER COAL CHARGING CAR



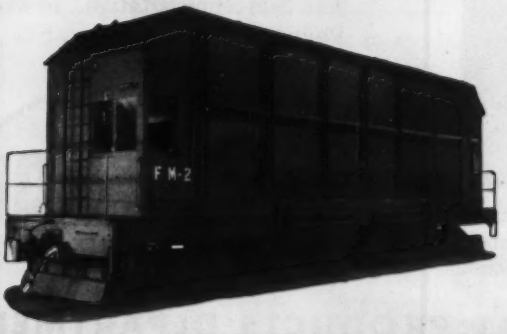
COKE QUENCHER



HYDRAULIC DOOR MACHINE



40-TON COKE TRANSFER CAR




THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.


# LETTERS TO THE EDITORS

## Clients Referred to STEEL

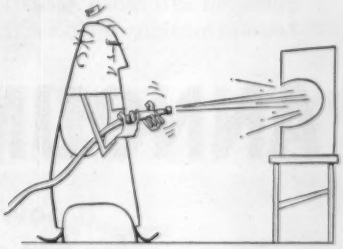
During the last few months, I have found myself continually referring to your publication and the 1955 Program for Management series in conversations with my clients.

My field is consulting engineering, and, in many ways, your articles strike deep into the heart of many of my clients problems. Frequently, I recommend subscription to your publication (even to clients in an entirely remote field) for you continually strike at the heart of problems universal to all business.

At this moment, many of my copies of the Management Series are badly worn and some are missing. I would appreciate reprints of this series.

Robert A. Markell
164 Greenbrook Road
Dunellen, N. J.

## Liquid Blasting of Surface



An article, "Liquid Honing Smooths the Way" (Jan. 9, page 71), referred to liquid abrasive blasting work by the R. W. Benton Co. We have been unable to find an address for the company. Do you have it?

Frank K. Roberts
Plant Engineer
Anaconda Wire & Cable Co.
Muskegon, Mich.

• *Contact W. C. Ehlert, R. W. Renton Co., 877 Addison Rd., Cleveland 3, O. The name, "Benton," was a typographical error.*

## No Package Plan for Salesmen

Certainly think you did a nice job on the article, "Fair Pay for Salesmen" (Jan. 9, page 27).

It is general enough to give management food for thought in meeting this problem of salesmen's compensation. I have always felt there is no package plan that is applicable to all companies. To me, it has been about 20-per-cent fundamentals and 80-per-cent application.

You certainly outlined the major points of the problem (and outlined them well!).

David Crew
Staff Assistant
Sundstrand Machine Tool Co.
Rockford, Ill.

## Just Plain Cold Water

We would appreciate detailed information on the item, "Better Tensile Test," in the Technical Outlook column of Jan. 16 (page 67). It tells of a shorter way than the Charpy notch impact test to determine the transition point between ductile and brittle zones of metals.

A second unrelated inquiry concerns

*(Please turn to page 12)*

# THE STRONGEST WIRE MAKES THE STRONGEST ROPE... THAT'S WHY ONLY 1105 IS USED IN

## ROEBLING

*Royal Blue*

WIRE 1105 ROPE

1105 WIRE is the strongest and toughest rope wire that has ever been developed.

Royal Blue is a new all-steel wire rope. It's made of 1105 wire—stands up in service—gives you more for your money because it has more to give.

Ask us for the full facts about Royal Blue Wire Rope, or contact your Roebling distributor.

**ROEBLING**

*Subsidiary of The Colorado Fuel and Iron Corporation*

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# PLEASANT LIVING is an industrial asset in North Carolina

The year 'round mild climate of Mid-South North Carolina, the "Variety Vacationland", is a benefit to industry in more ways than one.

Lower building and maintenance costs provide dollars and cents savings. Less tangible, but of even greater effect, is the value in employee stability and happiness. Workers are more contented, handle their jobs with more enthusiasm, because of the all-year recreational opportunities.

Key personnel find North Carolina to their liking, too. The scenic mountains, the famed golf courses, the long coast are all accessible here for family enjoyment.

Desirable industrial sites in this growing area are still available, both urban and rural locations. Complete information will be sent promptly on request by mail, telegram or phone to the Director, Dept. of Conservation and Development, Raleigh 10, North Carolina.

**NORTH CAROLINA**

**YEAR 'ROUND MID-SOUTH**

# LETTERS

*(Concluded from page 10)*

the article, "Chromium Plating Rocket Motors" (page 74). Reference is made to "frigid hydrogen monoxide." Have we been missing something, or is this another name for anhydrous hydrogen peroxide?

I. W. Rozian
Supervisor
Process Research & Development Sec.
Planning & Administrative Dept.
Ford Motor Co.
Dearborn, Mich.

• *For information on the Technical Outlook item, write: F. J. Lydick, Technical Publicity, Westinghouse Electric Corp., 401 Liberty Ave., Box 2278, Pittsburgh 30, Pa.*

*Frigid hydrogen monoxide is not anhydrous hydrogen peroxide. It is plain* cold, pure water. *To our regret, this slipped past the editors.*

## Industry Seeks College Grads

We would like three copies of the article, "More College Recruiting" (Jan. 23, page 40).

We feel we do a reasonably good job of recruiting, but this article brought out one point we have failed to do. Thank you for writing about such information. It is helpful to a new man and also a good review for the older fellow.

Steve Polaski
Personnel Assistant
Sundstrand Machine Tool Co.
Rockford, Ill.

## Water Now Can Be Used

In the Technical Outlook column of Jan. 16 (page 67), there is an item, "Now Water." It indicates that for magnetic particle inspection, a suitable wetting agent and rust inhibitor has been found, which uses water as a solvent. We are interested in obtaining more information.

John W. Welty
Assistant Director of Research
Solar Aircraft Co.
San Diego, Calif.

• *Write W. Neal Lang, News Bureau, General Electric, Schenectady 5, N. Y.*

## Uses for Light, Strong Steel

We are interested in obtaining data on industries which buy low-alloy, high-strength steels and the end uses of these steels. Perhaps you can refer us to a source of information.

Henry Davis
Manager-Market Research Dept.
Wickwire Spencer Steel Division
Colorado Fuel & Iron Corp.
New York

• *From the Oct. 5, 1953, issue, we are forwarding the articles, "Light Steel Adds Service Pounds" (page 88) and "Getting More for your Steel Dollar" (page 90). For more information, contact Charles M. Parker, assistant vice president, American Iron & Steel Institute, 350 Fifth Ave., New York 1, N. Y.*

## At Wendel Research & Mfg. Corp.

# Shell Dromus Oil E increases tool life 60%, provides better cooling and increased production

Wendel Research & Mfg. Corp., Albertson, New York, encountered extremely short tool life when drilling A.I.S.I. 4140 steel used in the manufacture of pilot ejection seats. They also experienced broken bits, chip welding, discoloration and burning of the tools. Shell Dromus Oil E was recommended to combat these difficulties. Here are the results:

Dromus Oil E immediately ended Wendel's trouble. The drill and steel bar stock were very cool and easy to handle. Chip settling was excellent, and discoloration of tools and work was completely eliminated.

Here are some of the outstanding features of Dromus Oil E:

1. Excellent wetting and cooling properties—wets all metal surfaces extremely fast.
2. Provides longer tool life—better finish.
3. Not sticky or greasy—keeps tools and work exceptionally cool.
4. Forms a solution, not an emulsion . . . is stable in any concentration.
5. Easy to mix in hot or cold, hard or soft water.

Write for information on Shell Dromus Oil E. See how it can help you increase tool life.

**SHELL OIL COMPANY**
50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

# Yes YOU CAN sharpen carbides WITHOUT diamonds

## BIG ATTENTION-GETTER at the MACHINE TOOL SHOW

These men in the huddle are watching Ex-Cell-O's new METHOD X MACHINE—many of whom actually sharpened tools on the machine—and all were impressed by the process that eliminates the diamond wheel in sharpening carbides.

- The "grinding wheel" is simply a cast-iron disc.
- It does both roughing and finishing.
- It cuts carbides and steel at the same time.
- *Cuts any material that's an electric conductor!*

**EX-CELL-O Method X TOOL SHARPENER**

lengthens the life of your CARBIDE TOOLS because this process leaves

- NO heat checks—
- NO grinding cracks—
- NO saw-tooth cutting edges

# EX-CELL-O Method X TOOL SHARPENER

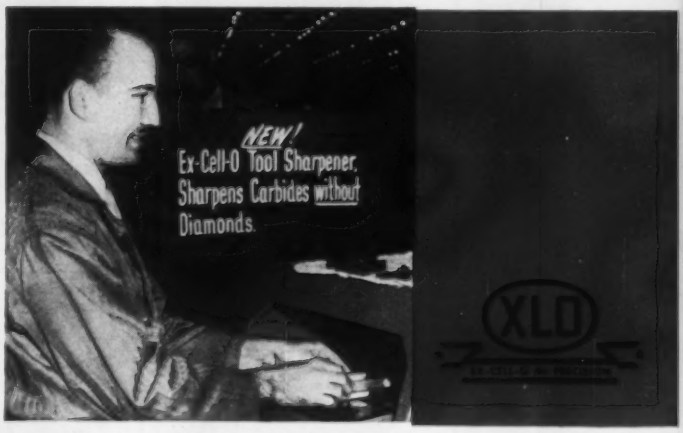
## You save the cost of your Method X Machine *over and over,* because you use *no diamonds*

Ex-Cell-O's Method X is an electromechanical process, sometimes called electro-spark erosion, for off-hand sharpening of single-point tools. A current source has its positive terminal connected to the tool to be sharpened (which is at ground potential) and the negative terminal is connected through the mounting flange to an iron disc. A semi-solid dielectric or insulating film is applied to the disc to provide a spark gap. As the tool is oscillated across the disc, current pulsations jump across the spark gap, dislodging particles from the workpiece.

Method X produces a non-directional matte finish, the coarseness of the texture (and cutting speed) depending on the power selected. In the power unit, the electrical energy is stored for an instant, then quickly discharged. There are two cutting rates, selected by positioning a switch. The machine electric control is built to NMTBA and JIC standards.

Phone your local Ex-Cell-O representative — or phone, wire or write Ex-Cell-O in Detroit for all the facts about METHOD X.

**EX-CELL-O METHOD X TOOL SHARPENER has an Ex-Cell-O Precision Spindle with inbuilt motor that rotates the 10-inch cast-iron disc. The tool-rest table is of ample size to support large tools firmly. The protractor plate indicates setting in degrees . . . No coolant is needed in the sharpening process.**




**Method X off-hand tool sharpening is much like conventional grinding. Cutting speeds for carbides are comparable with those for grinding with diamond wheels. Your operators with experience in conventional grinding can change to the Method X process with brief instruction.**

**EX-CELL-O**
CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
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ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866

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TOOL WEAR...–75%
MACHINING SPEED...+100%
ON THIS GRAY IRON RING

...thanks to

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Users everywhere report similar experiences. In fact, on 67 machining tests in 11 large machine shops, castings of gray iron treated with FERROCARBO averaged 89.5% greater machinability per tool than untreated castings. These premium castings are finer-grained, denser, stronger, yet they COST YOU NO MORE...because your foundryman, using FERROCARBO, makes worthwhile savings in raw material costs.

FOR FREE BOOKLET on FERROCARBO, citing actual case histories of faster machining, with longer tool life, write The Carborundum Company, Dept. 53, Niagara Falls, N.Y. 64-69

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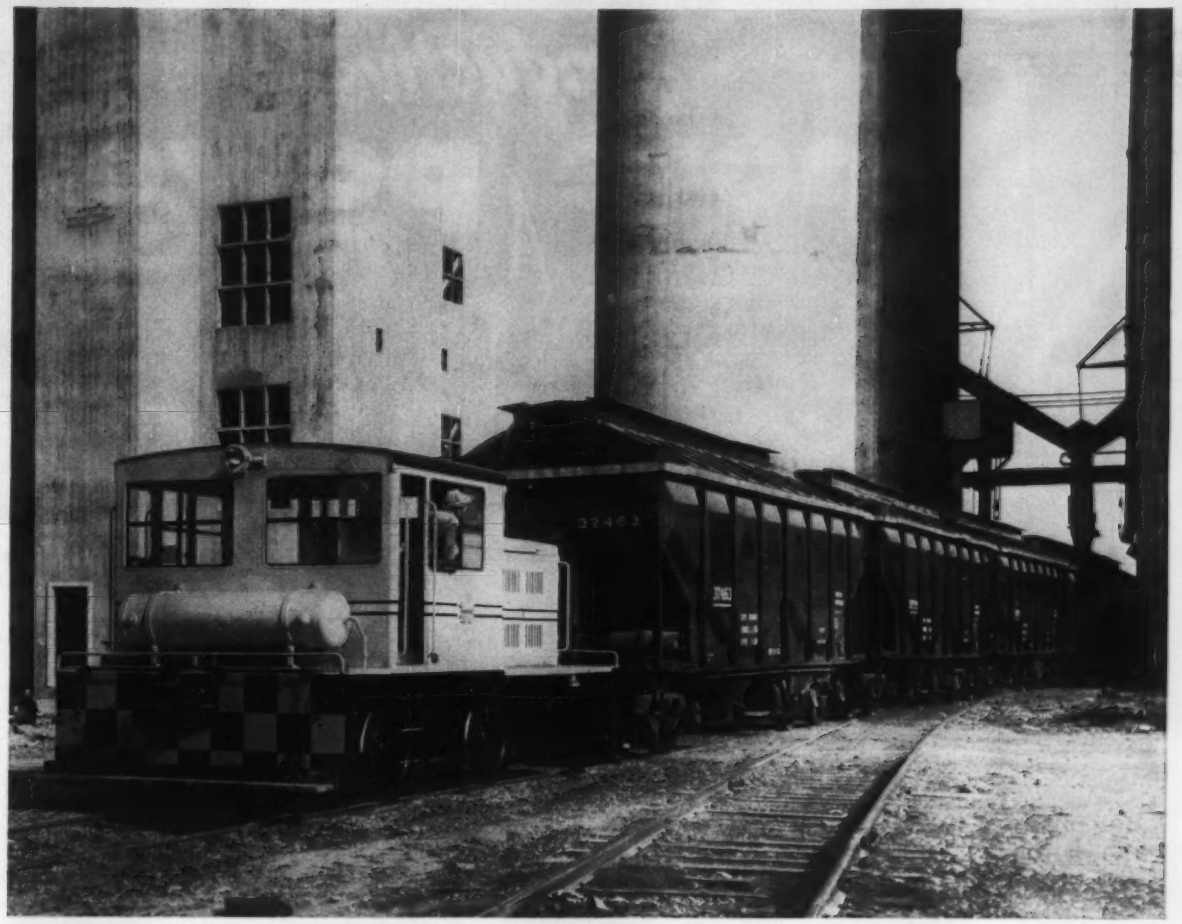

ANDERSON ELEVATOR COMPANY, Maumee, Ohio, reports:

# Profits are Fatter since Plymouth cut Handling Costs

"We handle more cars than ever before with our 35-ton Plymouth," says Superintendent Don Bullis. "Plymouth's economy in switching cars for loading, unloading and spotting under the spouts has resulted in big time and money savings.

"Top performance in handling cars one at a time or in strings of forty-five is just part of the story. We've cut time, labor and maintenance costs, and even in hardest use the Plymouth burns only two gallons of fuel per hour. Anderson profits are fatter since Plymouth cut the handling costs."

Fatten your profits by cutting hauling and handling costs. There's a Plymouth for every job—Models from 3 to 70 tons . . . Gasoline or Diesel, Mechanical or Torqomotive Drive.* Also Diesel-Electrics. Write today for free catalog to PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-1, Plymouth, Ohio.

*TORQOMOTIVE DRIVE: Plymouth Transmission coupled to a Hydraulic Torque-Converter

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

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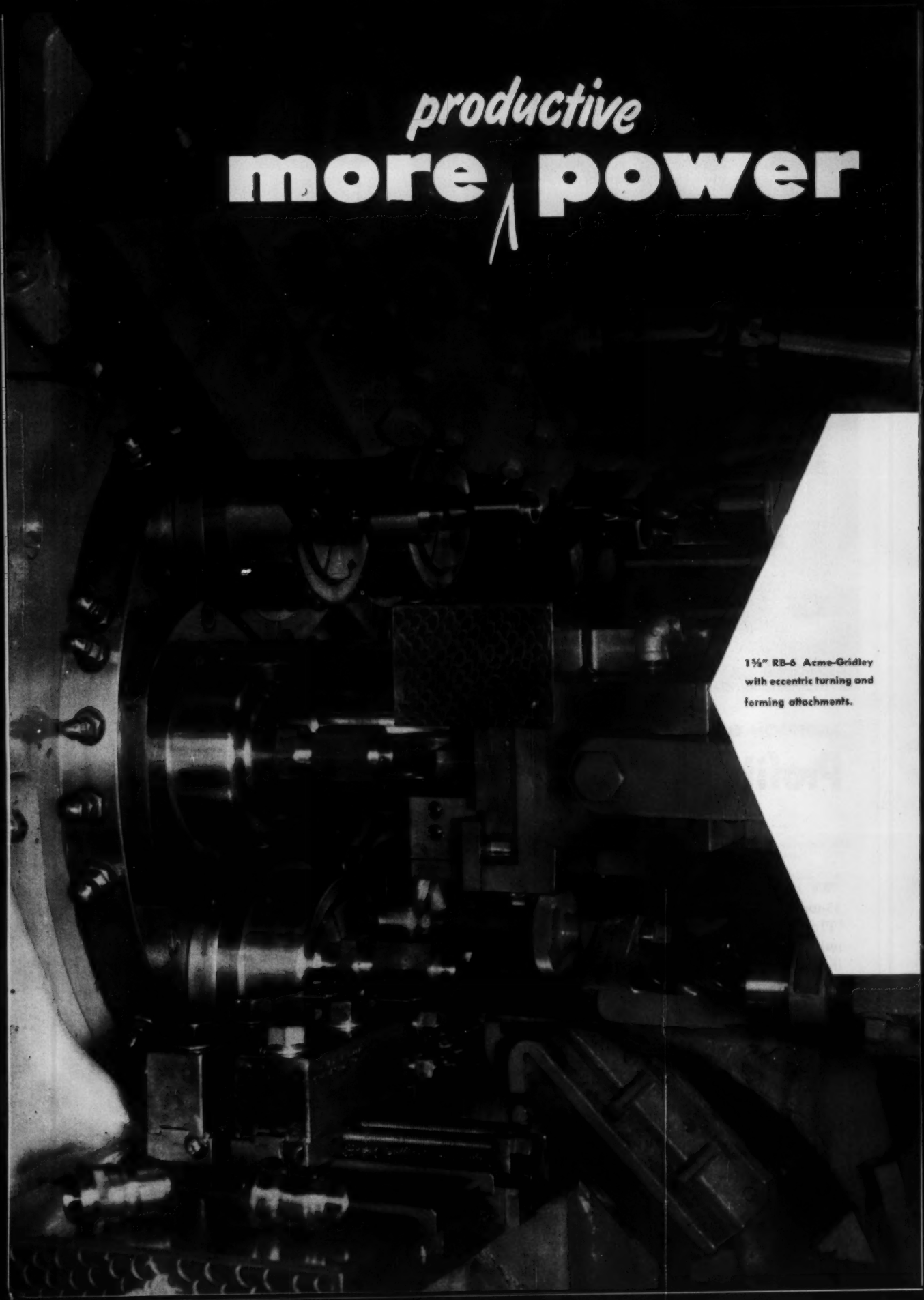
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1⅝" RB-6 Acme-Gridley with eccentric turning and forming attachments.

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## *Acme-Gridley* independently-operated direct cross-slide camming

Lets you use maximum machine horsepower for rapid metal removal—without chatter and at predetermined accuracy—throughout an entire run. Basic design of Acme-Gridleys built for heavy cuts calls for proper distribution of "beef" in the machine frame to rigidly support top, bottom and intermediate slides so that they can transmit power to the tip of the tool with no linkages.

Cross slides operating from their own cam drums not only improve overall machine efficiency, but extend the range of applications for which the machine can be tooled. And when, as in the case of Acme-Gridleys, ample frame strength is combined with short coupled power transmission to the tool, you've got a combination that pays off in two ways—improved performance and reduced maintenance.

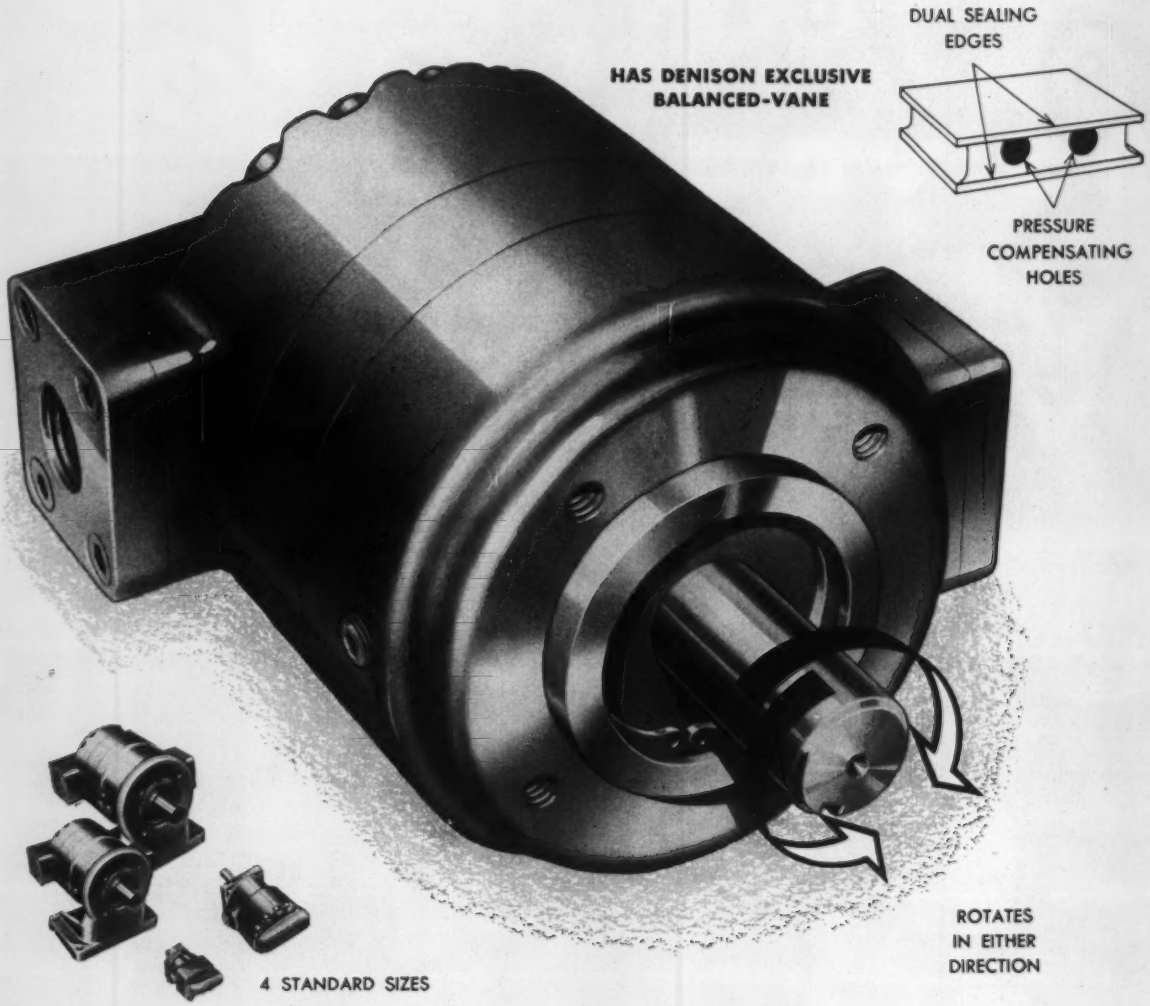
*LET US TELL YOU MORE ABOUT*
***Acme-Gridley* BASIC DESIGN**

Independently-operated, direct camming is but one of many BASIC DESIGN features which are responsible for Acme-Gridley's outstanding performance records. May we send you additional information? Or, better yet, let us send a representative to discuss possible production short cuts with you.

# National Acme

THE NATIONAL ACME COMPANY, 189 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: • Newark, N. J. • Chicago, Ill. • Detroit, Mich.




# for continuous 2000 psi service...

## *Vane type Denison hydraulic single stage, Pump/Motor*

**IT'S A PUMP**—high delivery in a small, compact package . . . a continuous 2000 psi pump.

**IT'S A MOTOR**—high stalled torque up to 257 pound-inches per 100 psi. Takes high shock pressures without danger.

**EXCLUSIVE**—Denison *Radially Balanced* Vane; *Cuts wear* between cam ring and vane; *Increases efficiency* with dual sealing edges; *Reduces pulsation* by radial pumping action of vanes.

**SIMPLIFIES INVENTORY**

**No need to stock** separate pumps and motors. Runs as a pump or motor without alterations. Range of capacities in each size through interchangeable cam rings.

**EITHER DIRECTION**—Operates efficiently as a pump or motor without change in piping. Minimum internal friction in either direction because of greatly reduced contact pressure between vanes and cam ring.

**STANDARD SIZES**—as a pump, Range of delivery 2.5 to 77 gallons per minute at 2000 psi.
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**MORE INFORMATION**—Send for Bulletin P-5-A giving complete specifications. Write . . .

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HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

# 30 TONS PER HOUR

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This 1955 model HA is the youngest of three "PAYLOADER" units working at Pennsylvania Malleable Iron Corp., Lancaster, Penn. It is also the most productive tractor-shovel for its size that they have ever seen. Mr. E. F. Stolpe, the owner says, "Believe the new HA the best machine for our operations." It is used mostly for handling sand and coal — moves 30 tons per hour, 55 hours per week.

Hundreds of other owners of the new model HA are equally enthusiastic and pleasantly surprised by the superior performance and greater capacity of the new model HA. "Rollback bucket carries more material" . . . "does the work of two machines on some operations" . . . "less spillage and practically no floor clean-up" are some of the actual comments from other owners.

It will pay you to find out what a "PAYLOADER" can do for your material handling problems. Your "PAYLOADER" Distributor is ready to show you. Use the handy coupon opposite.

**For higher lifts and more capacity — the new model HAH 1 cu. yd. capacity**

**THE FRANK G. HOUGH CO.**
876 Sunnyside Ave. • Libertyville, Ill.

- ☐ Send data on Model HA (1¾ cu. yd.)
- ☐ on new model HAH (1 cu. yd.)
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**PAYLOADER®**
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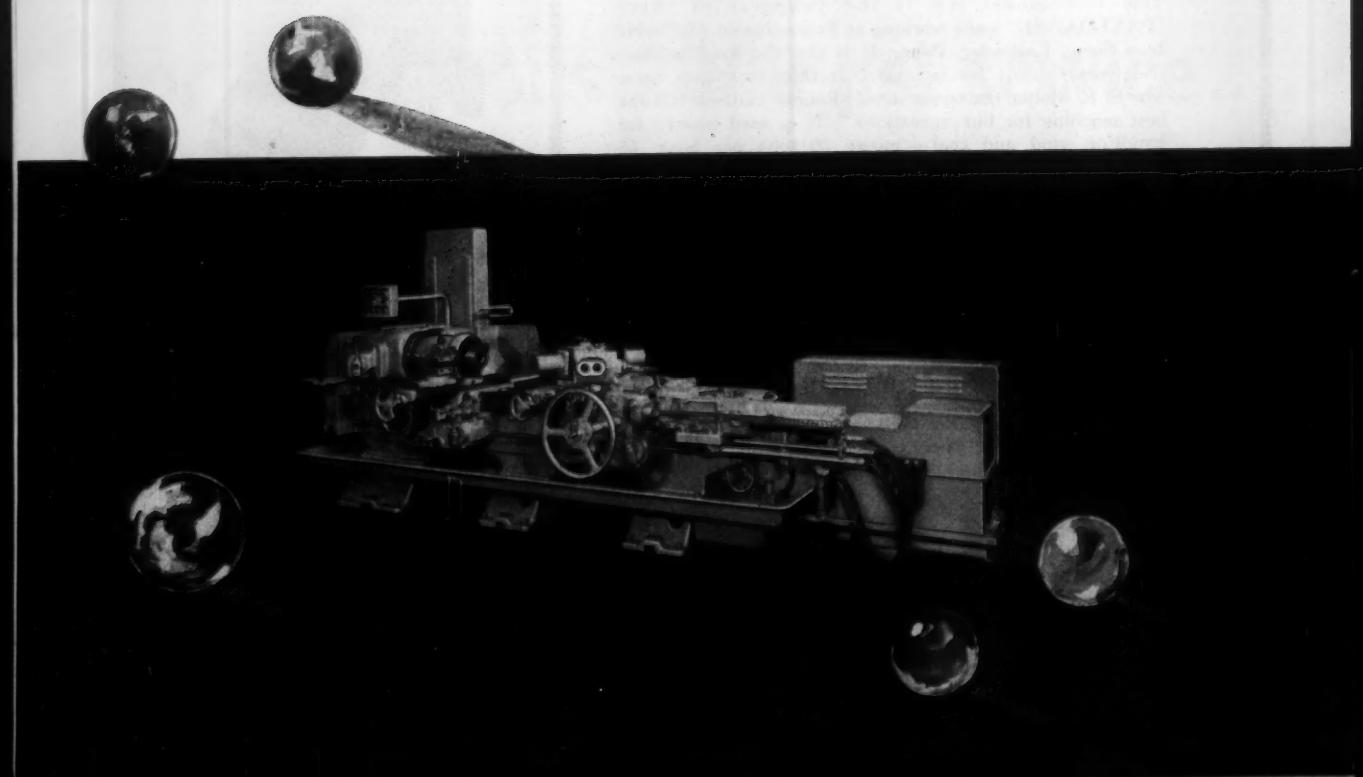
# CHILD'S PLAY



Speed is not enough! To pay for itself out of reduced operating costs and increased profits, today's machine tool must be:

1. Easy to understand. 2. Child's play to operate.

3. Quick to convert in change-over and re-tooling.

4. Push-button simple to demonstrate in operator training.

Here are a few of the many advanced engineering features which have made today's Jones & Lamson machine tools the most flexible and cost-efficient metal cutting equipment in the industrial world today.

Two-way tracing combined with normal turret lathe operation; Hydra-clutch headstock and Geneva saddle for simple "on the machine" handling; Automatic handling, gaging, chip disposal, sorting, tool adjustment on single spindle automatics; Tape controlled turret lathes for flexibility on long or short run jobs with pre-set tooling, no hand controls; Thread and form grinders with fully automatic handling and machining cycles; Contour grinders controlled hydraulically or optically, and "Automatic thread chasing on standard turret lathes".

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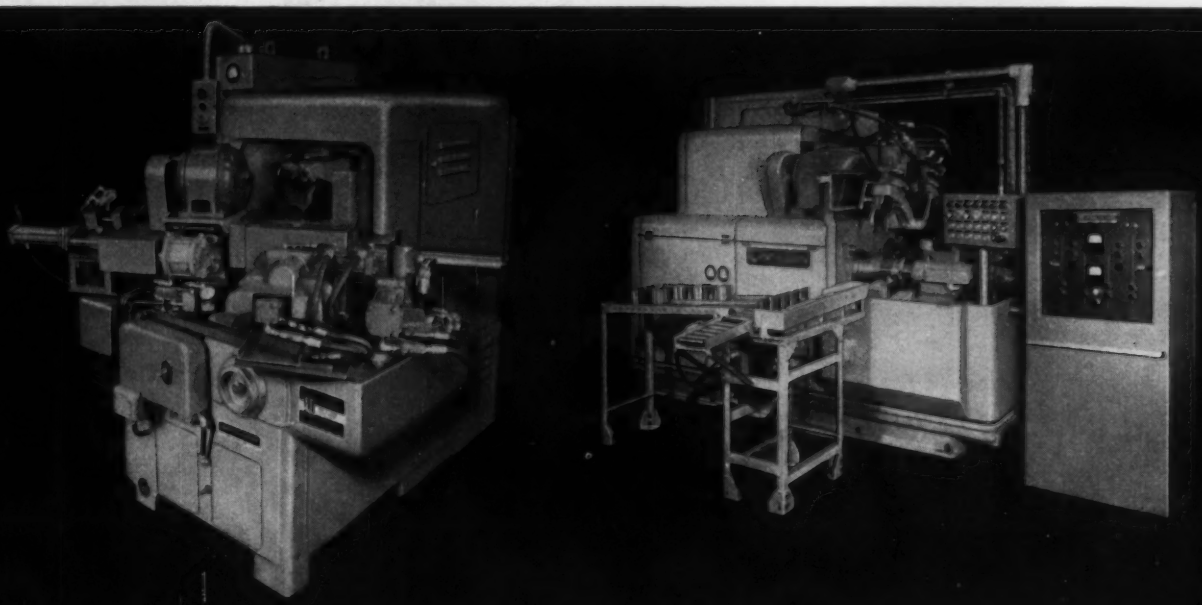

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Are you
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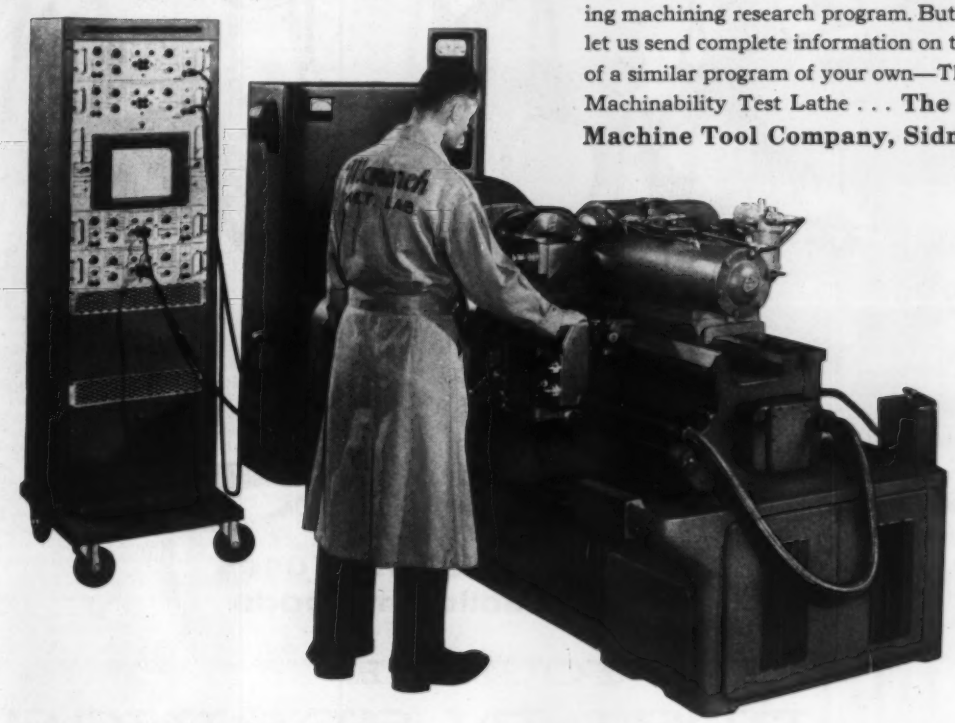
optimum
production
through high
removal rate,
shortest
cycle times,
longest
tool life?

Are you sure?

MORE AND MORE MANUFACTURERS today are *making sure* through practical research evaluated and applied to shop conditions. Using the Monarch Machinability Test Lathe for individual machining tests on parts produced, they establish proper cutting speeds and tooling to produce economical tool life at high surface speeds. And it pays off in production!

With our Machinability Test Lathe and proper instrumentation you can determine the resistance of a metal to plastic deformation and the amount of energy converted into heat. You can determine normal tool wear. Measuring vertical or cutting force and feed force, you can calculate power, heat in cutting and the unit shear strength required to form a chip. And you can be sure.

Come to Sidney to see our facilities for a continuing machining research program. But meanwhile, let us send complete information on the keystone of a similar program of your own—The Monarch Machinability Test Lathe . . . **The Monarch Machine Tool Company, Sidney, Ohio.**



**The Monarch Machinability Lathe. Use it for basic research (mechanics of cutting); for establishing carbide grade selection and tool wear; machinability of metals and material control; production standards. It provides an infinite range of feeds and speeds (130-3000 RPM)—a 25 H.P. variable speed drive—a versatile use of instrumentation.**

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**THE MONARCH MACHINE TOOL CO.**
**Sidney, Ohio**

I would like more information on your Machinability Lathe. Please send your illustrated booklet #1807.

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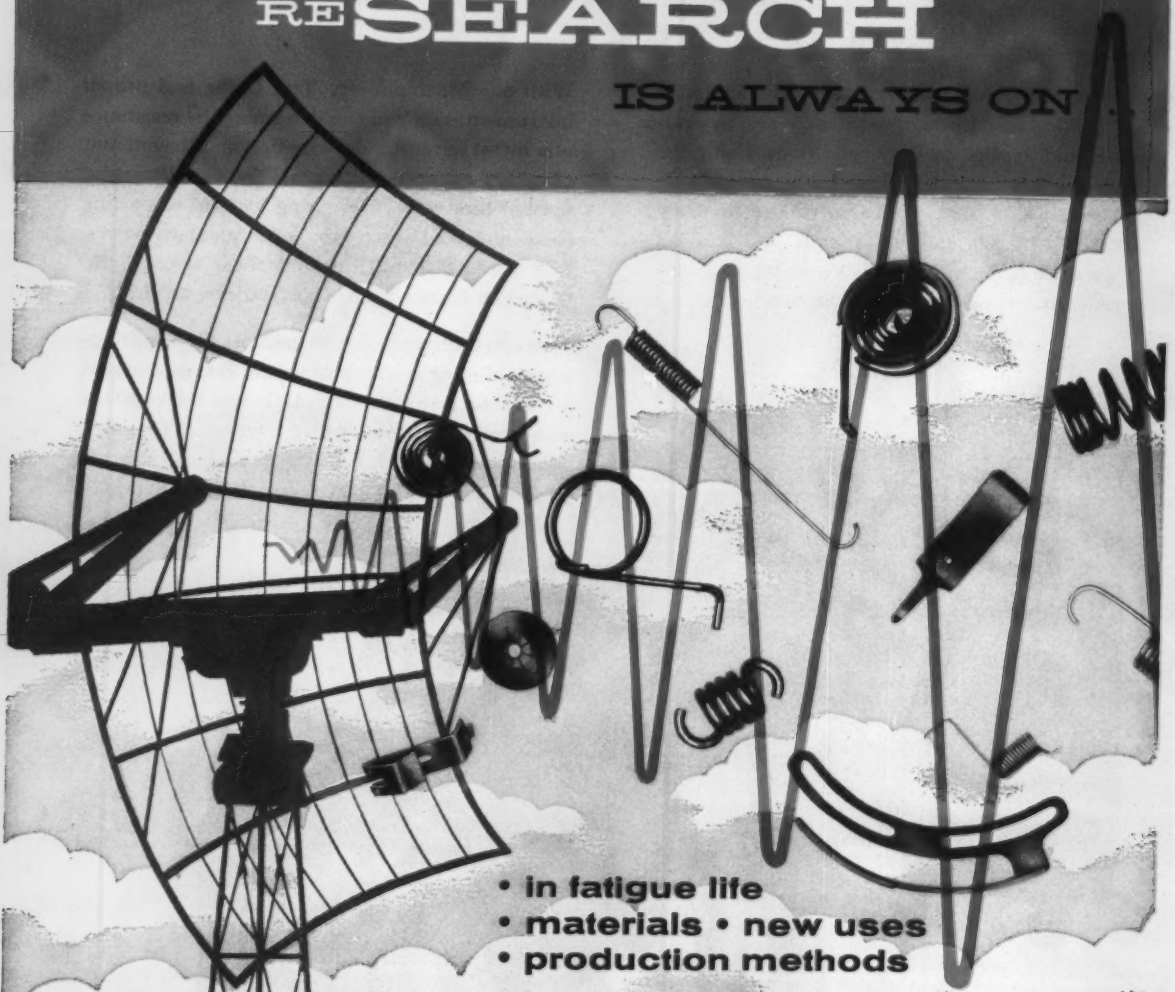
## IS ALWAYS ON



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# CALENDAR
## OF MEETINGS

**Feb. 13-17, American Society of Civil Engineers:** Winter meeting, Baker hotel, Dallas. Society's address: 33 W. 39th St., New York, N. Y. Secretary: William N. Wisely.

**Feb. 15-17, American Management Association:** Personnel conference, Palmer House, Chicago. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

**Feb. 16-17, Drop Forging Association:** Winter industry meeting, Park Sheraton hotel, New York. Association's address: 419 S. Walnut St., Lansing, Mich. Executive vice president: Edgar L. Harden.

**Feb. 16-17, Eastern States Blast Furnace & Coke Oven Association:** Winter meeting, William Penn hotel, Pittsburgh. Information: B. W. Norton, Shenango Furnace Co., Sharpsville, Pa.

**Feb. 19-23, American Institute of Mining & Metallurgical Engineers:** Annual meeting, Hotels Statler and New Yorker, New York. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

**Feb. 20-22, Association of Iron & Steel Engineers:** West Coast meeting, Hotel Statler, Los Angeles. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

**Feb. 26-29, American Institute of Chemical Engineers:** Winter meeting, Hotel Statler, Los Angeles. Institute's address: 120 E. 41st St., New York 17, N. Y. Secretary: F. J. Van Antwerpen.

**Feb. 27-29, American Management Association:** Annual electronics conference and exhibit, Hotel Commodore, New York. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: J. O. Rice.

**Feb. 27-Mar. 2, American Society for Testing Materials:** Committee week, Hotel Statler, Buffalo. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

**Mar. 5-6, Instrument Society of America, Pittsburgh section:** Conference on instrumentation for the iron and steel industry, Hotel Webster Hall and Mellon Institute of Industrial Research. Society's address: 845 Ridge Ave., Pittsburgh 12, Pa. Secretary: Fred Marton.

**Mar. 6-8, Society of Automotive Engineers Inc.:** National passenger car, body and materials meeting, Hotel Statler, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

**Mar. 11-14, National Association of Waste Material Dealers Inc.:** Annual meeting, Waldorf-Astoria, New York. Association's address: 271 Madison Ave., New York 16, N. Y. Managing director: Clinton M. White.

**Mar. 12-14, International Acetylene Association:** Annual meeting, Hotel Statler, Los Angeles. Association's address: 30 E. 42nd St., New York 17, N. Y. Secretary: H. F. Reinhard.

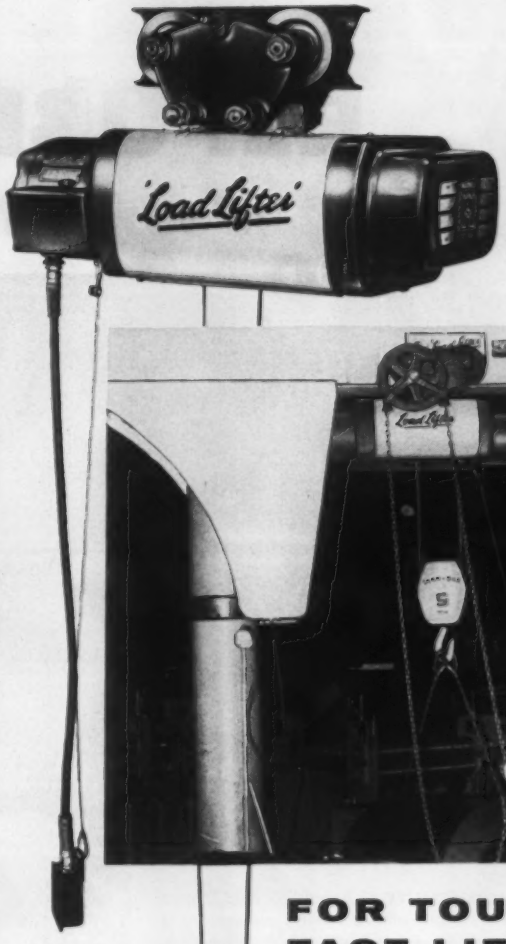
**Mar. 12-15, National Electrical Manufacturers Association:** Mid-winter meeting, Edgewater Beach hotel, Chicago. Association's address: 155 E. 44th St., New York 17, N. Y. Managing director: Joseph F. Miller.

**Mar. 12-16, National Association of Corrosion Engineers:** Annual meeting and exhibit, Hotel Statler, New York. Association's address: 1061 M & M Bldg., Houston 2, Tex. Executive secretary: A. B. Campbell.

**Mar. 13-15, Radio-Electronics-Television Manufacturers Association:** Spring meeting, Biltmore hotel, New York. Association's address: 777 14th St. N. W., Washington 5, D. C. Secretary: James D. Secrest.

**Mar. 14-16, American Society of Mechanical Engineers:** Aviation conference, Hotel Statler, Los Angeles. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

**Mar. 14-16, Pressed Metal Institute:** Annual Spring technical meeting, Carter hotel, Cleveland. Institute's address: 3673 Lee Rd., Shaker Heights, O. Managing director: H. A. Daschner.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Today's tight production schedules demand hoisting equipment that will stand up under daily heavy-duty cycling without attention. This is exactly the performance you get from a Series "700" 'Load Lifter' Electric Hoist. Even though simply designed and constructed for easy maintenance *in the air*, your serviceman will seldom open the covers of this hoist. It is built to step up lifts per hour and step down the cost per lift in your plant.

The Series "700" 'Load Lifter' Electric Hoist was first with safe 24 volts at the pendant control. Capacities now range up to 15 tons. Single and two-speed models. All types of suspension. Ask your "Shaw-Box" Distributor for details or write for Bulletin 410.

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**EXCELLENT MACHINABILITY** of Republic's cold drawn steel helps Stanley Tools achieve uniform high quality in each Yankee Screw Driver spiral milled shaft. In addition, the cold drawing process produces marked improvement in the physical properties of any given analysis . . . including higher ultimate strength, yield point and hardness.

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Fine materials are an absolute must in the manufacture of the ingenious "Yankee" Spiral Ratchet Screw Driver. And that's why Republic Cold Drawn Steel is used for the heart of the unit, the precision, spiral milled shaft.

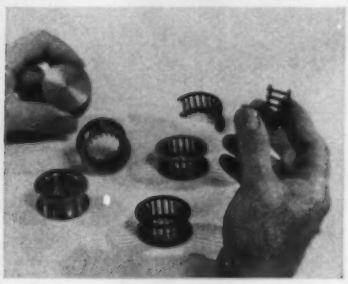
This is the part that bears the brunt of the operation . . . converting a push into a twist . . . making fastening jobs easier and quicker. It is vital in maintaining "Yankee's" world-wide reputation for dependable, trouble-free operation.

Years ago, Yankee Tools, Inc., now a division of Stanley Tools, selected Republic as their steel supplier for this critical application. Their decision was based on Republic's ability to furnish cold drawn bars of precise size and cross section, excellent physical properties and a high degree of machinability. The continuing success of the "Yankee" Spiral Driver is ample evidence of the wisdom of this choice.

Your Republic representative or Union Drawn Distributor is prepared to work with you in developing or improving your product using cold drawn steel bars or shafting. He can offer you a complete range of carbon, alloy and stainless analyses in all standard shapes and sizes. Or you can investigate the possibilities of securing major savings through the use of special sections. Contact him today. Mail the coupon for full information.

### OTHER EXAMPLES OF THE RIGHT STEEL IN THE RIGHT PLACE INCLUDE...

**TOUGH, DURABLE, PUMP PARTS** shown here are made of Republic ENDURO® Stainless Steel, Type 416. Its free-machining properties permit cutting speeds up to 85% of standard Bessemer screw stock. In addition, it offers good corrosion-resistance, very high physical properties, and is hardenable. For full information, mail coupon today.



**THIS BEARING RETAINER** for a connecting rod assembly proved extremely difficult to machine. However, Republic metallurgists and machining specialists worked with the manufacturer to secure volume production using Republic Cold Drawn Alloy Bars. Their uniform machinability extended tool life and produced both the fine surface finish and strength required.

**RATCHET DOGS** for this wrench are simply short lengths cut from a Republic Cold Drawn Special Section. The result is a great saving in machining plus improved physical properties in the parts. Investigate the possibility of using special sections in your product. Your savings may be enormous. Send coupon for complete data.

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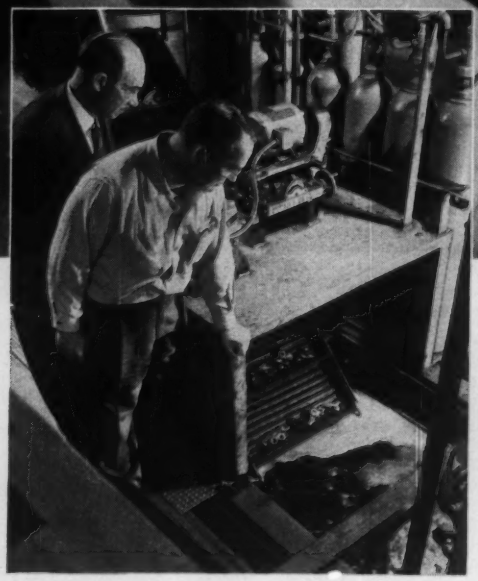

The Gulf Super-Quench in the bath above has been in use for 2½ years at Cummins' Columbus, Indiana plant with only normal makeup oil being added. Cummins is the world's leading independent manufacturer of lightweight, high-speed Diesel engines. Left—Gulf Sales Engineer G. C. Shimer and G. R. Dellinger, Supervisor, Heat Treating Dept., check the rocker lever parts for Cummins Diesels as they emerge from the Super-Quench.

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# Why Cummins Engine Company, Inc. has used GULF SUPER-QUENCH for 15 years!

Deeper, more uniform hardness without cracking or distortion and the virtual elimination of rejects in quenching Diesel engine parts are the reasons behind Cummins' use of Gulf Super-Quench for the past 15 years.

Another factor is the ability of this outstanding quenching oil to retain its fast dual quenching power indefinitely with only normal make-up. There is no need for additive replenishment.

For additional information on the economy of using Gulf Super-Quench, send the coupon below or have a Gulf Sales Engineer help you discover opportunities to use this quality product—profitably — in your shop. Consult the yellow pages of the telephone directory for the number of your local Gulf office.

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Please send me, without obligation, a copy of your 24-page brochure dealing with the application and advantages of Gulf Super-Quench.

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# Here's how you can help make stainless plate stocks go a LONG way...

Whenever demand outdistances supply you have problems. But any problem can be solved when all hands cooperate. If you keep in mind these "rules of the road" you will be able to add extra mileage to the supply . . .

1. If you have a D.O. rating, give it to your supplier—it helps him get the necessary nickel, and protects your position on his schedule.
2. If you are going to cut plate into smaller pieces, give your supplier the option of furnishing small pieces.
3. Plan ahead as much as possible, so your supplier has a reasonable chance to meet your delivery requirements.
4. If an alternate analysis or a slight variation in gage is acceptable, let your supplier know.
5. Buy "cut-to-shape" pieces and reduce your time and costs of handling scrap.
6. Clean out your stainless scrap so that it can get back into production.
7. Order only what you need in stainless plate—to exact size.

Put these simple rules to work . . . it will help you, and all of us, stretch the supply to the limit.

*Stainless Steels Exclusively*

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# Let this "Visiting Fireman" train your men to fight fire . . . it could save your business

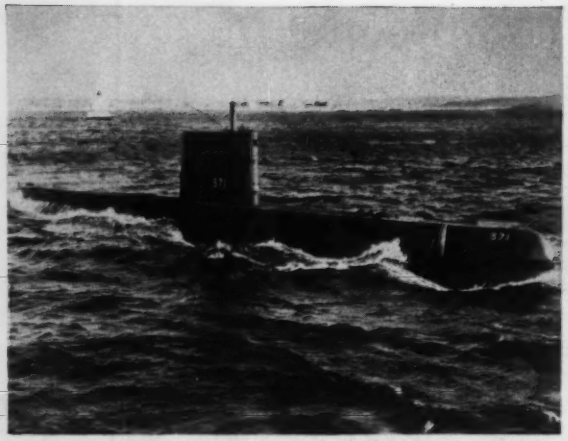
You have a *potential* fire-fighting team right in your plant. These would-be fire fighters *could save your business if fire struck unexpectedly*. All they need is training, the kind that will enable them to respond instantly and properly to any kind of fire emergency.

Ansul can provide this training for a group of your men just as it has for hundreds of its customers. And there will be no charge. It is just one of the "essential" services that Ansul provides for its customers.

Twenty years experience in the fire protection industry has proved to Ansul many times over that all the fire equipment in the world will not save your business *unless* trained hands are available to man that equipment. So, it is important to Ansul that you get *training* along with the fire equipment you buy. Only then will you experience the security that goes with having a complete fire protection program. Only then will you get what you really pay for, what you really need—*complete fire protection*.

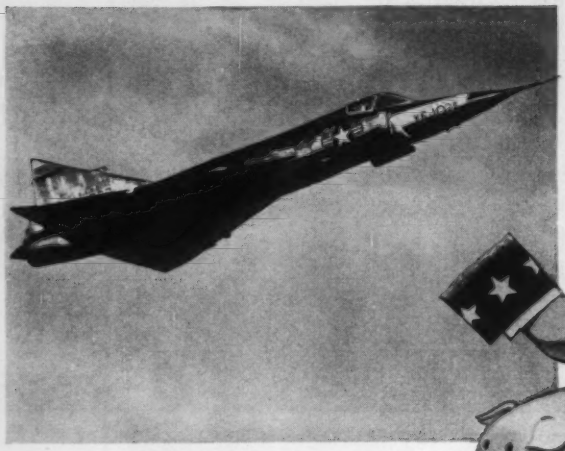
You owe it to the life of your business to learn more about Ansul's in-plant fire training service. Get in touch with your local ANSUL MAN through the yellow pages of your phone directory, he will be happy to call on you and explain all of Ansul's customer services in detail. Or write to THE ANSUL CHEMICAL COMPANY, Dept. S-2, Marinette, Wisconsin.

ANSUL

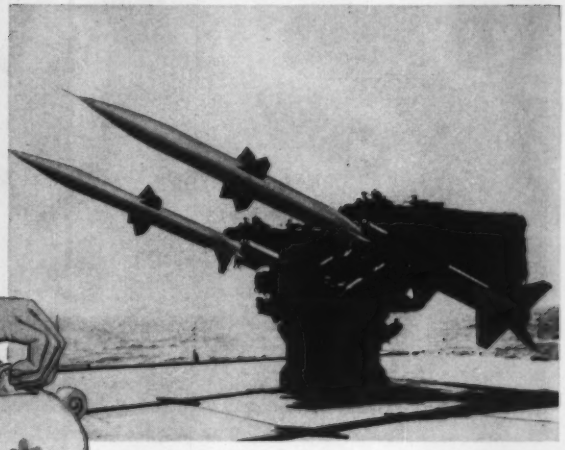


"Nautilus" Atomic Powered Submarine

Boeing B-52 "Stratofortress"



Convair F-102A Interceptor



Convair "Terrier" Surface-to-Air Missiles

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The taxpaying public usually pictures Uncle Sam as being a loose man with a dollar, busily throwing our cash away with both hands. American industry, serving the defense program, will tell you nothing can be farther from the truth. On the contrary, the Government is running for top honors for sharp-pencil buying.

Typical of the Government's conservation program is the wide acceptance of rolled and flash welded rings as the most economical way to produce circular weldments for jet aircraft engines, guided missile parts and many other products of our military defense program.

"Value Analysis" is fast becoming a part of American industry's buying procedure. For further information on ring applications write to:

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# Metalworking Outlook

## Auto Cutbacks Hit Suppliers

Look for more layoffs and shorter work weeks among companies supplying the automobile industry. Says one Michigan supplier which recently cut back from a 48-hour to a 35-hour week: "Ford's 20-per-cent reduction meant a 40-per-cent production cut for us." Reason: Inventories at both Ford and the supplier piled up on top of parts already in the production cycle. Further auto cuts will force layoffs.

## Spending Plans Mapped

How sound is the automobile market? Says Secretary of Commerce Sinclair Weeks: "The amount of consumer credit is not the main question. Rather we should watch its quality. A recent survey by Federal Reserve Board shows that 29 per cent of American families don't own a car." Over the next decade, the Commerce department estimates that America must add: Capacity to produce 101 million kilowatts of power; 3.3 million miles of highway; almost a million classrooms; and replacement of 5 million housing units and reconditioning of 15 million more. The total bill: $196 billion, or almost $20 billion a year.

## Steel Boosts Coal Outlook

Steel production demands close to 1¼-tons of coal for each ton of steel, rather than the old rule of thumb of ton for ton, believes National Coal Association, Washington. NCA sees future markets for heavy tonnages of coal tied up with the electric furnace and use of induction heating in steel rolling. "Electric furnaces could create a market for upwards of 25 million tons of additional coal. Induction heating of steel billets requires 1 ton of coal to generate the power to heat 6½-tons of steel."

## Color TV Hits Its Stride

By 1958, says Benjamin Abrams, president, Emerson Radio & Phonograph Corp., color TV prices will be in the $300-to-$400 range. Last week Radio Corp. of America's color assembly lines at Bloomington, Ind., started to roll. By year end, RCA says it will make "over 200,000" sets. "By 1957," says Robert A. Seidel, vice president, "most of our TV dollar volume will come from color." It's estimated that the industry will make upwards of 300,000 sets this year. Emerson plans 1000 a week by year end.

## Outlook for Oil

By 1965, American oil companies must spend $73.5 billion on expansion. That's the estimate of Chase Manhattan Bank, New York. The bank's annual survey forecasts increase in U. S. demand for oil at 53 per cent from present levels during the next decade. Oil and gas are consuming

almost 8 per cent of our steel output for well equipment, pipe lines, refineries, storage tanks and other items.

## Pressure on Mergers

Washington's stepped-up interest in mergers soon may be reflected in a bill requiring companies to give advance notice to the government. The Justice department and Federal Trade Commission agree to ask for a 90-day notice where combined assets of the consolidating companies exceed $10 million. Failure to notify the government or failure to provide additional data if requested could bring a fine of up to $50,000.

## Tax Cuts Coming?

U. S. Chamber of Commerce believes the economy will be able to afford a $3-billion tax cut in fiscal 1957, even if election year pressure brings an individual income tax cut this year. The chamber proposes reduction of individual taxes by $1.7 billion; reduction of the corporate income tax rate by "not less than two percentage points; reduction of the Korean excises by $500 million." It estimates there will be a surplus of at least $1 billion in this year's federal budget, and of at least $3 billion in fiscal 1957.

## Boom in Plastics

After a year's hesitation in 1954, the reinforced plastics industry in 1955 far exceeded its customary yearly growth rate of 40 per cent. Outlook for 1956: A 50-per-cent increase. Attractiveness of the plastics industry to metalworking companies seeking diversification is increasing. Borg-Warner Corp., Chicago, is expanding its Marbon Chemical Division. The bill for new plant and equipment will run $10 million.

## Win Friends and Influence Labor

Employee stock purchase plans, suggests Associated Industries of Cleveland, may be one way to win friends and influence people in labor. AIC finds that the plans can pay off for small and medium-sized companies just as well as the big ones. In a survey of 13 companies, ten employing fewer than 500 people, all but one reported their plans were worthwhile. Most-mentioned dividend: Better human relations.

## Straws in the Wind

Southern area truckers jumped the gun on the Feb. 25 rail freight increase. They've announced hikes of 10 per cent on small shipments and 7 per cent on large ones . . . 1960 has been "tentatively established" as the date when manual shift will no longer be available on cars as standard equipment . . . Because of sharp increase in demand for titanium, fast tax write-offs for melting facilities may be reconsidered by Office of Defense Mobilization. Solar Aircraft Corp., San Diego, Calif., says it has orders of several million dollars for titanium fabrications . . . Navy makes conditional awards for ten-year charter of 14 high-speed tankers to be built in U. S. yards . . . Westinghouse Electric Corp. says the strike has cost $75 million in lost wages.

# what's new

## IN STAINLESS STEEL FROM STOCK

**Extra-Large Plates & Sheets—** You can save on welding costs and improve the appearance of big fabricated pieces now that you can get stainless plates and sheets from Ryerson stocks in extra-large sizes. Types on hand: *Plates*—304, 304L, 315 and 316L in 96″ widths up to an inch thick, and 80″ widths even heavier. *Sheets*—304, size 72″ x 144″, in 10, 11, 12, 14 and 16 gauges.

**Aircraft Steels Specs:** Just off the press, a new booklet on aircraft quality stainless and alloy steel containing latest information on Aeronautical Specifications (Military (MILO, Air Force-Navy (AN), Federal (QQ-S) and AMS). Also included: a complete listing of aircraft quality stainless and alloy steels available for quick shipment from Ryerson. To get your copy, write your nearest Ryerson plant or Box 8000-A, Chicago 80, for Booklet 103.

**Stainless Pipe for Welding Applications:** Now there's no need to wait for mill deliveries or to use expensive stabilized types when you want stainless pipe suitable for welding. Type 304L pipe, an extra low carbon type that eliminates the need for stress relieving after welding, has recently been added to Ryerson stocks. Size range: Schedule 40 welded pipe in commonly used sizes from ¼″ through 2″. Schedule 40 seamless in 3″, 4″ and 6″ pipe sizes.

**Save 7¼¢ Per Pound!** For mild corrosion applications, type 430 straight-chrome stainless often serves quite as well as nickel-bearing types—and you save 7¼¢ per pound! Ryerson stocks include Type 430 sheets in many gauges and sizes. Technical data on request.

**Easy-to-Weld Plates and Sheets, Too!** Both stainless sheets and plates in Type 304L and Type 316L have recently been added to Ryerson stocks. In applications involving welding and stress relieving, where carbide precipitation may occur, these extra-low-carbon steels can often replace expensive stabilized types.

**Save 30% on Ornamental Tubing!** Recently added to Ryerson stocks, Type 302 ornamental stainless tubing is priced substantially below comparable stainless tubing for other than ornamental purposes. Yet it is more than satisfactory for many applications such as in restaurant and hospital equipment.

**Joseph T. Ryerson & Son, Inc.**

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Whether you need a single piece of stainless or a truckload draw on Ryerson stocks of more than 2200 sizes, shapes, types and finishes.

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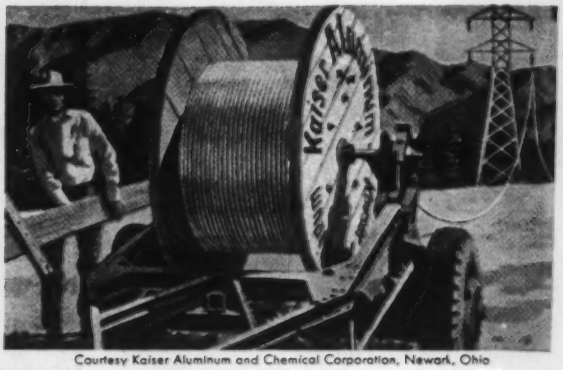
## *DSC *ACSR Core Wire Supplies the Muscle for Aluminum Power Transmission Cable*

The steel wire used for reinforcement in aluminum cable cores is a Specialty Wire. Produced by our Portsmouth Division, it is a high carbon wire, hard drawn and heavily galvanized.

ACSR specifications are not easy to meet. They permit little leeway in chemical composition, physical properties, weight of coating, dimensions and finish. Uniformity is a must.




Courtesy Kaiser Aluminum and Chemical Corporation, Newark, Ohio

## *The Record*

During the full year of 1955 we supplied millions of pounds of Portsmouth ACSR wire. Out of every 100,000 pounds shipped, 99,470 pounds on the average met all acceptance tests . . . a performance score of 99.47%.

Whether it's Rod and Wire products or Sheet and Strip, *DSC steelmanship* is the same. Your DSC Customer Representative will help you wherever possible.

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*Whether you buy your steel from mill or warehouse it has to suit your job requirements just the same . . . Reliance Job-Fitting does it. Try us and see.*

For your day-by-day requirements

RELIANCE READY-MADE *Job-Fitted* SHEET AND STRIP

COLD ROLLED STEEL STRIP: Coils • Cut Lengths • All Tempers.
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# Plan Your Growth

Metalworking economists may differ on the outlook for business in the remainder of 1956. Some believe it will continue the upward trend started a year ago. Others think it will level out or dip in the second half.

But on the outlook for metalworking over the longer pull—the next five, ten or fifteen years—there is little difference of opinion. The direction is up, up sharply.

Metalworking dollar volume is expected to gain more than a third by 1960. By 1970 it should more than double last year's record of $128 billion.

For metalworking companies, the outlook presages a growth period unlike any this generation, probably any generation, has seen. It will be a planned growth tailored to fit the needs of an expanding economy.

Part of it will come through new facilities. The basic steel industry, which is projecting a 15-million-ton expansion for the next three years and a 60-million-ton increase by 1970, will have to build many new plants. The auto industry is betting billions on new installations, many far removed from Detroit.

Much of the growth will be accomplished through plant additions and the installation of more efficient equipment. This year the metalworking industry will increase its capacity by 6 per cent. Only 15 per cent of the companies expanding will build new plants. Two of five will add to present plants and nine of ten will expand by installing higher-capacity machinery.

Tomorrow's factories will produce more goods per square foot of floor space, just as today's home furnaces supply more Btus for their size than did their counterparts twenty years ago.

How, when, where and how much you grow are, of course, matters to be decided by each company in light of its own circumstances. Decisions will vary greatly.

One need will be common in building for tomorrow. You will have to plan your growth. Your plan will have to be fairly long range. You cannot afford to permit it to be affected by temporary ups and downs in the economy. In fact, an adjustment that makes materials, machines and labor more readily available may be a boon to those expanding their capacity.

In making your plans, it may be advisable to look back at previous prophecies. The strikingly uniform fact about those predictions of the size and shape of things to come is that they have fallen so far short of actuality.

Walter J. Campbell

EDITOR

Inspection with Magnaglo and black light reveals a crack in this axle.

# How MAGNAGLO* Helps Cut Costs

## —and Insures Reliable Quality at Clark Equipment Company

Finding crack-type defects in parts during production helps to keep costs down, and insure safety and dependability. These are prime aims at Clark Equipment Company. They know these aims can best be realized by methods that produce consistent reliable quality, economically.

To be sure of this, they utilize Magnaglo inspection. It is faster than visual—and much more accurate. Magnaglo helps find any possible cracks and helps determine the cause.

They save money by using inspection with Magnaglo to eliminate much waste motion. Time is not spent in completing cracked parts, since defects are discovered in the rough stage. Machining and labor costs are thus reduced, to keep Clark's costs and prices low and very competitive.

The $2500 Magnaglo unit was originally purchased as an aid to inspection in the axle shaft department. The inspection has now proven of value on many other parts, including knuckles, arms, and drive axles. Good sampling inspection practices usually serve to control quality in transmission and steering parts, bushings, tie-rod ends and bolts, and find "bugs" in manufacture before they cost money.

Quite likely one of the many Magnaflux Corporation test methods can do the same for you. Various methods work on every type material, at any stage of manufacture. Kits and units sell from $35.00 up to a few thousand dollars. No license required. Ask to have a Magnaflux* engineer call—or write for our bulletin on LOWER PRODUCTION COSTS.

*Magnaflux and Magnaglo are Registered Trademarks of Magnaflux Corporation*

**MAGNAFLUX CORPORATION**
7312 West Lawrence Avenue
Chicago 31, Illinois

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**MAGNAFLUX**

Proof of the pudding—a Clark fork truck operator deposits a skid of axles at the Magnaflux inspection station. Axles of this truck were originally inspected here.

For the past ten years, Clark Equipment Company has been using a Magnaflux unit similar to this model DR-543, with Magnaglo and hood. Other models at low price are available to suit your requirements.

## Annual Earnings of Selected Companies

| | 1955 | 1954 | 1953 |
|---|---|---|---|
| Avco Mfg. Corp. (Nov.)* | $ 758,311 | $ 3,639,436 | $ 3,427,185 |
| Black & Decker Mfg. Co. (Sept.)* | 3,695,776 | 2,824,314 | 2,654,417 |
| Budd Co. | 13,790,578 | 6,292,424 | 10,829,303 |
| Carborundum Co. | 5,187,055 | 3,283,704 | 5,721,553 |
| Caterpillar Tractor Co. | 34,773,082 | 25,129,239 | 20,254,514 |
| Chapman Valve Mfg. Co. | 837,969 | 1,348,271 | 851,327 |
| Container Corp. of America | 15,703,399 | 13,604,232 | 10,127,948 |
| Continental Motors Corp. (Oct.)* | 2,502,287 | 4,542,748 | 6,023,812 |
| Eaton Mfg. Co. | 13,275,000 | 8,559,021 | 9,687,309 |
| Foote Bros. Gear & Machine Corp. | 894,158 | 858,864 | 640,866 |
| General Motors Corp. | 1,189,000,000 | 805,973,897 | 598,119,478 |
| International Business Machines Corp. | 55,872,633 | 46,536,625 | 34,119,210 |
| International Harvester Co. (Oct.)* | 55,501,272 | 36,303,833 | 52,029,417 |
| Kennecott Copper Corp. | 125,615,418 | 77,906,288 | 88,753,873 |
| Lamson & Sessions Co. | 2,417,836 | 1,287,112 | 1,500,005 |
| McGraw Electric Co. | 9,500,000 | 9,417,000 | 6,987,000 |
| Arthur G. McKee & Co. | 900,000 | 1,805,679 | 2,498,263 |
| Oliver Corp. (Oct.)* | 4,796,380 | 3,707,295 | 2,809,517 |
| Pennsylvania Salt Mfg. Co. | 3,484,238 | 3,390,901 | 3,106,508 |
| H. K. Porter Company Inc. | 6,433,107 | 3,215,785 | 2,634,519 |
| Remington Arms Co. | 7,914,000 | 7,476,951 | 6,019,095 |
| Rockwell Mfg. Co. | 6,795,000 | 5,723,553 | 5,673,000 |
| South Bend Lathe Works (Nov.)* | 709,735 | 661,392 | 1,293,217 |
| Union Carbide & Carbon Corp. | 140,755,858 | 89,779,271 | 102,783,442 |

*Fiscal year ended

# First Half Profits Stay Up

**Second-best year in history. That's the opinion of metalworking executives queried on their profit outlook for 1956. Some industries may make records**

METALWORKING'S profits for the first half of 1956 will average higher than they did for the same period last year. But they probably won't match those of the last six months, mainly because automotive production is tapering off.

**Conclusions** — Those are the main findings of a STEEL check on the subject. Some others:

Blue chip companies, other than automotive, look for a first half profit that's 8 to 10 per cent better than 1955's first half and 3 to 5 per cent better than 1955's second six months.

Profits for parts makers, such as stampers, screw machine shops, foundries generally are not as high as for end product makers. Screw machine shops, for example, showed net profits after taxes of about 3 per cent on sales in 1955. General Motors (see the table) had a profit return of nearly 9.7 per cent.

Here is the profit situation for 1956's first half according to metalworking industries:

**Steel**—An alltime record six months is in the making.

**Nonferrous**—Prospects are excellent, particularly in aluminum.

**Fabricated Metal Products** — Competition is stiffer on the job shop levels in stampings, auto parts, screw products. For example, makers of the latter expect net profits this quarter to be only about 2.5 per cent of sales.

**Machinery**—Here's another area where the first-half profit outlook is about or nearly the best on record. Tool and die shops, for example, are completely sold out for the first half. Customers are even freely offering to pay premiums on hard jobs. Yet, one problem is that business is almost too good. To keep up with demand, Elwell-Parker Electric Co., Cleveland maker of industrial trucks, has to work 58 hours a week in some departments, which is a heavy charge on profits. Others have the same problem.

**Electrical Machinery** — The established companies expect to do as well as they ever have this half. But smaller firms, especially in electronics, are suffering growing pains that promise to limit their profits.

Electric Controller & Mfg. Co., Cleveland, Division of Square D Co., announces that 1955 was one of the best peacetime years in its history; prospects for the first six months of 1956 appear equally bright, with the possibility that the first half will exceed the last half of 1955.

**Autos**—On the downgrade, but still good.

**Railroad Equipment** — Freight car earnings may hit new highs. Locomotive and rail passenger car profits will be good but not sensational.

**Aircraft**—Expect no important change. Civilian business is improving slightly.

**Appliances**—High volume and low unit profit in appliances will keep earnings a little below the levels of the last six months.

**Shipbuilding**—Profits will rise,

but none too soon. They still have a long way to go to reach high-water marks.

**Scientific Apparatus**—Look for earnings to stay at or near the good levels of the last six months.

Because second-half business prospects are still uncertain, the profit picture for all of 1956 is also clouded. But, for what it's worth, the consensus is that 1956 earnings in metalworking generally will not quite equal those of 1955. That will make 1956 industry's second best year and more than respectable because the annual reports now flooding in indicate that 1955 set a sensational earnings record.

## IBM Expands

International Business Machines Corp., New York, has announced a major new expansion of west coast operations. The program will cost more than $15 million. It comprises two new data processing centers at Portland and Seattle, a new 1500-employee plant near San Francisco and two new office buildings. When the program is completed, IBM will have a total investment of $50 million in this area.

# Home Improvement

### Metalworking has a big stake in current campaigns for adequate home wiring

THE NATION'S electrical contractors have a $2.5-billion rewiring job ahead of them. The project: Providing 25-million dwelling units with adequate wiring.

There are 45 million dwelling units today, of which 10 million were built since 1940. At least 35 million are obsolete, electrically speaking. They are incapable of efficiently using electrical appliances and equipment now installed.

**Expectations** — Electrical manufacturers sold 338 million appliances from 1949 through 1953. They expect to sell 428 million in the five-year period ending in 1958. Convinced that the demand is there and that the utilities can provide the necessary electrical energy, they are concerned about upgrading American homes to consume their products.

Kennecott Copper Corp., New York, reports skimpy wiring blocks sales in 80 per cent of the homes. Some 25 million dwelling units can be brought up to snuff by rewiring.

**New Load**—Increased appliance sales alone represent a $2-billion market for new generation, transmission and distribution equipment to take care of the increased electrical load.

The National Electrical Manufacturers Association predicts residential consumption of electrical energy will exceed industrial consumption in the not too distant future.

**Promotions** — Organizations actively supporting the Housing & Home Finance Agency's recent proclamation of Home Improvement Year include: NEMA, National Adequate Wiring Bureau, U. S. Chamber of Commerce and the National Association of Home Builders.

## U.S. Firms Get a Break

Two American firms will get orders for power plant equipment because an Italian firm that underbid them is dominated by Communist controlled Italian labor union CGIL, says the Interior department.

Apparent low U. S. bidders are Elliott Co., Jeannette, Pa., $145,402 for two 2750 kva generators at the Deer Creek power plant in Utah and Baldwin-Lima-Hamilton Corp., Philadelphia, $220,000 for a hydraulic turbine for Roza power plant in the state of Washington.

The Italian firm had bid $124,000 for the Roza turbine and $124,489 for the Deer Creek generators.

## Lightweight Train Makes Bow

This year may be remembered by railroad men as the time that lightweight trains were introduced by U. S. railroads. If so, Rock Island Railroad's Jet Rocket may also be remembered as the first of the new trains delivered to any American road.

While General Motors' Aerotrain was back in the sheds last week for modification, the Rock Island's new lightweight was making the first of its demonstration runs. On Feb. 11, it was put into regular service between Chicago and Peoria, Ill.

**Nickel Plate Basket Car For Forgings**

Now in use between a Canton, O., forging plant and a Detroit auto assembly plant is the Nickel Plate Road's latest development to meet shippers' special requirements. Adapted from a flat car, the basket car carries 24 wire containers, each weighing about 5,000 lb when loaded with forgings. Two forklift trucks can load a car in 35 minutes, road officials say

## Accounts Receivable: Little Change

| | % Discounting or Paying When Due | | | % Accounts Past Due | | |
|---|---|---|---|---|---|---|
| | Dec. 1955 | Sept. 1955 | Dec. 1954 | Dec. 1955 | Sept. 1955 | Dec. 1954 |
| **Ferrous & Nonferrous Metals** | | | | | | |
| Manufacturing, Industrial Accounts | 88.3 | 90.0 | 87.9 | 11.7 | 9.9 | 12.0 |
| Wholesale, Distributor, Jobber Accounts | 89.8 | 89.0 | 86.9 | 10.2 | 11.0 | 13.1 |
| **Industrial Machinery & Equipment** | | | | | | |
| Manufacturing, Industrial Accounts | 90.0 | 87.0 | 87.4 | 10.0 | 13.0 | 12.6 |
| Wholesale, Distributor, Jobber Accounts | 89.6 | 88.9 | 85.5 | 10.4 | 11.1 | 14.5 |
| **Electrical Equipment & Supplies** | | | | | | |
| Manufacturing, Industrial Accounts | 89.0 | 88.4 | 98.7 | 11.0 | 11.6 | 10.3 |
| Wholesale, Distributor, Jobber Accounts | 74.5 | 81.0 | 80.5 | 25.5 | 19.0 | 19.5 |

Source: Nation-wide survey by Credit Research Foundation Inc., New York

# Metalworking Credit: A-2

**Keen competition for business will bring some problems. Credit departments are paying close attention to smaller accounts and to customers' working capital**

GENERALLY good, but with some trouble spots: That's the story on metalworking credit for the year ahead.

Bills are being met on time by most sectors of the industry (see table). The most notable exceptions are among distributors of electrical equipment and supplies, where there's been a marked falloff in payments since last summer. Otherwise, accounts receivable are generally in better shape than they were in 1954.

**Care Needed** — High business levels anticipated for the rest of the year should keep credit healthy. "But," warns the National Association of Credit Men, New York, "strong competition, high sales volume and rising prices merit the careful attention of credit management."

"Our credit department is paying close attention to our smaller accounts," agrees C. L. Whitaker, assistant treasurer, Republic Steel Corp., Cleveland. "Sound management is more essential than ever. There'll be no boom-time umbrella to shelter inadequacies this year."

**Warehouse Report**—Steel and nonferrous warehouse operators estimate that their payments are averaging 30 to 35 days, as opposed to 40 to 45 days in 1954. Says E. H. Harwell, president, Nottingham Steel Co., Cleveland: "Delinquent accounts are running less than one-tenth of 1 per cent of our sales, and about 50 per cent of our customers are discounting their bills."

Adds another large northern Ohio warehouse: "We're handling from 4000 to 5000 accounts each month. Some 200 of these have been running past due, though there has been an improvement in the last month. Problem companies? . . . You name them. They've ranged from building contractors to screw machine products shops."

Steel warehousemen agree with Mr. Whitaker that most problem accounts are in the small company class.

**Growth Pains**—Warning of a possible credit situation in the aircraft and aircraft parts industries is sounded by K. Tibbitts, vice president, National Credit Office, New York. Because of two rulings dating to last year, less government money will be available for financing new contracts.

"In electronics," adds Mr. Tibbitts, "there's a clear-cut case of capital shortage causing credit difficulties." He explains that, for the most part, companies are small and family owned. They can't find capital fast enough to expand production to meet demand.

Mr. Tibbitts believes that the fast rate of new company formation in this industry obscures the magnitude of the problem. "Last year, new companies started up faster than one a week, thus distributing the burden."

**Financing**—The National Credit Office also notes significant problem areas among companies manufacturing consumer appliances and farm equipment. Most are attributed to distribution practices. To promote volume business, makers are having to stretch the ratio of accounts receivable to sales further than ever before.

Some companies are dipping into their operating capital to support distributors' inventories. In farm equipment, at least three big manufacturers have financing plans. In consumer appliances, General Electric Co., Schenectady, N. Y., for example, maintains a subsidiary that buys preferred stock in distributorships to help out their financing problems. Philco Corp., Philadelphia, has a plan which covers floor stocks.

**Impact**—The National Credit Office believes that the disappearance of three major washer manufacturers during the last year is a direct result of their inability to compete with this type of distribution financing. One thing is sure: It places a severe strain on any but the healthiest capital resources.

Other special situations are noted by credit executives selling to the construction industry. Increased competition among builders is leading to reduced profits. Suppliers may find themselves handling more marginal accounts. They look for slower payments and more requests for special terms.

**Outlook**—Sums up NACM: "We surveyed over 400 credit and fi-

nancial executives. While they're anticipating excellent business conditions, they're keeping a close eye on these barometers: 1. Working capital, which may be strained by plant expansion and mounting interest rates. 2. Growth of investment in accounts receivable. 3. Demand for higher credit lines and extended terms. 4. Increases in sales to marginal accounts.

## Tungsten Piles Up

General Services Administration won't buy about $2.5-million worth of tungsten it contracted for during the Korean war. Enough of that metal is now stockpiled so the pressing need for it is pretty well over.

The producer, O'Kiep Copper Co., Union of South Africa, was agreeable to the cutback in a contract that originally called for $7 million, says GSA.

## Tin Pact Signed

With Indonesia's signature this week, the International Tin Agreement finally goes into effect.

A "buffer pool" of tin metal will be built up to about 25,000 long tons, financed by storage purchases from individual member nations. Operators will try to smooth tin prices and to balance supply with demand by buying metal from the pool when values sag and selling when prices move up. Supplementing the buffer will be a system of export restrictions by producing countries.

## Prospects For Uranium

Atomic-powered electrical plants will be consuming 22,150 tons of uranium a year by 1975, predicts Henry C. Anderson, manager of product planning and development for General Electric Co.'s atomic power equipment department at Schenectady, New York.

The forecast does much to dispel miners' fears of overproduction after 1962, when the Federal Government's purchase monopoly is due to expire. It's estimated that some 9 million tons of ore would have to be mined to produce one year's requirement of refined uranium.

*Rising salaries are another clear indication of . . .*

# Importance of the Foreman

THE AVERAGE factory foreman makes 15 per cent more a month than he did in 1953. Wages of hourly workers are up 11 per cent.

The Associated Industries of Cleveland believes these relative increases indicate management's awareness of the importance of the foreman to the executive team. The AIC surveyed 102 companies employing 1920 foremen and 63,920 hourly workers in Cleveland.

**Highs and Lows**—The average foreman makes $551.39 a month. Classified by function (see chart) the average ranges from $637.85 to $513.92. Within the three groups ("A," "B" and "C"), there are other highs and lows: "A" foremen from $450 to $1000 a month; "B" foremen from $350 to $800; and "C" foremen from $300 to $700.

Fringe benefits, such as pensions, insurance, hospitalization, holidays and paid vacations, cost management 35 to 40 cents an hour per foreman.

**Overtime Pay**—Foremen are paid for overtime worked by 62 companies—time and a half in most cases. Other forms of payment include Christmas gifts (28 companies); year-end bonus (17 companies); production bonus (11 companies).

Foremen are separated from workers by wage differentials in 59 of the 102 companies surveyed. Fifty-four companies do not require them to punch time clocks, and 32 of those do not ask foremen to report their own working time.

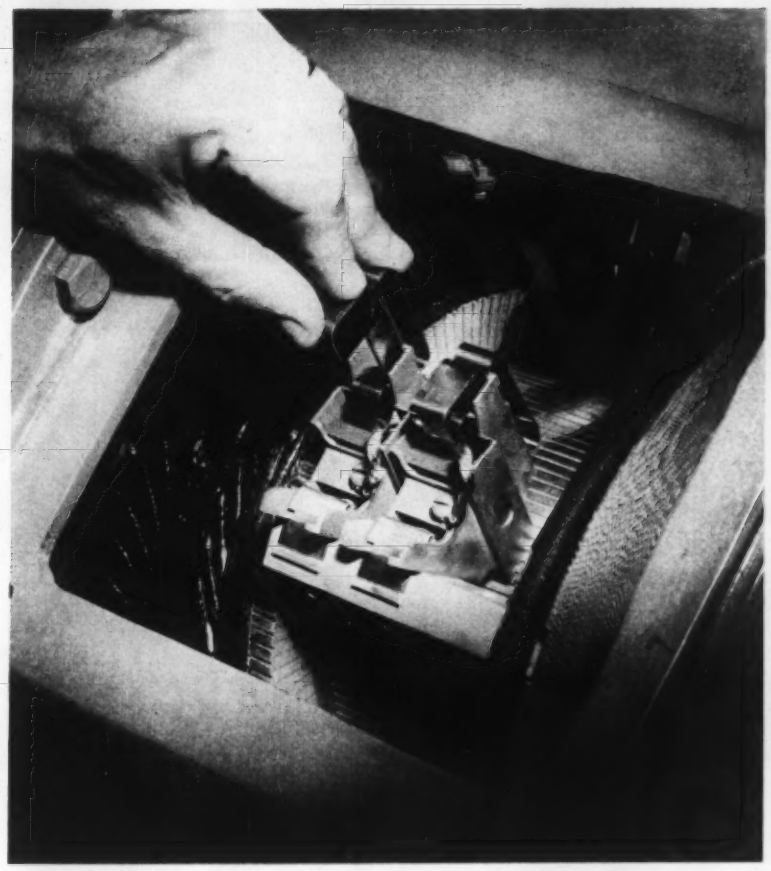
**Management Contact** — Foremen come into contact with their own supervisors in various ways: 44 companies distribute policy manuals, and 83 have foremen who participate in periodic management meetings. Weekly meetings are held by 28 companies; monthly meetings by 21 companies.

Advanced training is offered in foremanship by 20 companies. Technical and trade magazines are given out by 44 companies.

## Profile of an Average Foreman

| | Foreman "A" | Foreman "B" | Foreman "C" |
|---|---|---|---|
| His Boss is | Superintendent or Factory Manager | Foreman "A" | Foreman "A" or "B" |
| His Function is | General Foreman | Intermediate Foreman | Assistant Group or Job Foreman |
| His Responsibilities include | Hiring, Firing; Rate Changes and Promotions | Same as "A" in a smaller plant | Same as "A" or "B" on a reduced basis |
| He Supervises | Multiple Shifts (74 Workers) | One Shift (35 Workers) | One Shift (22 Workers) |
| He Makes each Month | $637.85 | $551.22 | $513.92 |

Based on a survey by the Associated Industries of Cleveland



Large hand holes permit simplified maintenance of GE's new DC motors

# GE Announces New DC Line

WHAT HAPPENS when you start to redesign a motor and generator line to meet the current and future demands of automation?

**Answer**—General Electric Co. reports that it invested three years of market and engineering research, plus $20 million for modernization, relocation and expansion of its DC department before introducing a new line of motors and generators (Kinamatic) to metalworking early this month.

"Our introduction of this line is based on GE's conviction that the use of DC equipment will grow at a considerably faster rate than the electrical industry, which will double in the next ten years," says Oscar L. Dunn, general manager, GE DC Motor & Generator Department.

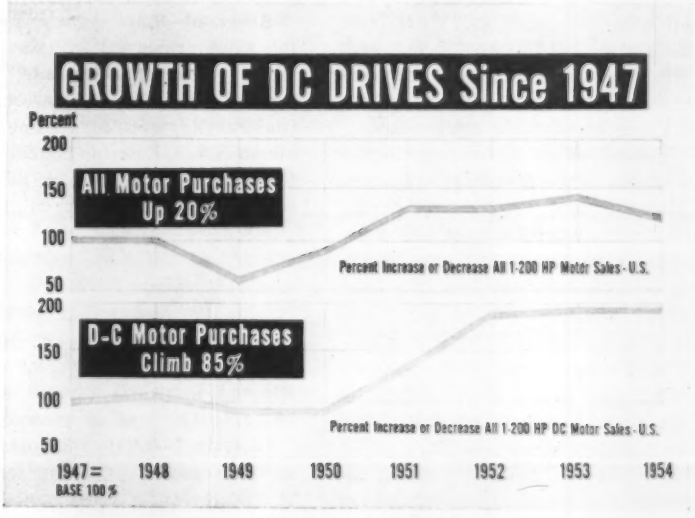
**Beginning**—Three years ago an extensive field study was undertaken to substantiate the company's thinking on what features and improvements the new line should include. The results served as a guide for the engineering task force which was set up in 1953 to revamp GE's B and CD motor lines. The Kinamatic line conforms to the newly suggested NEMA standards for future design. Ratings currently in production range from 1 to 150 hp at 1750 rpm.

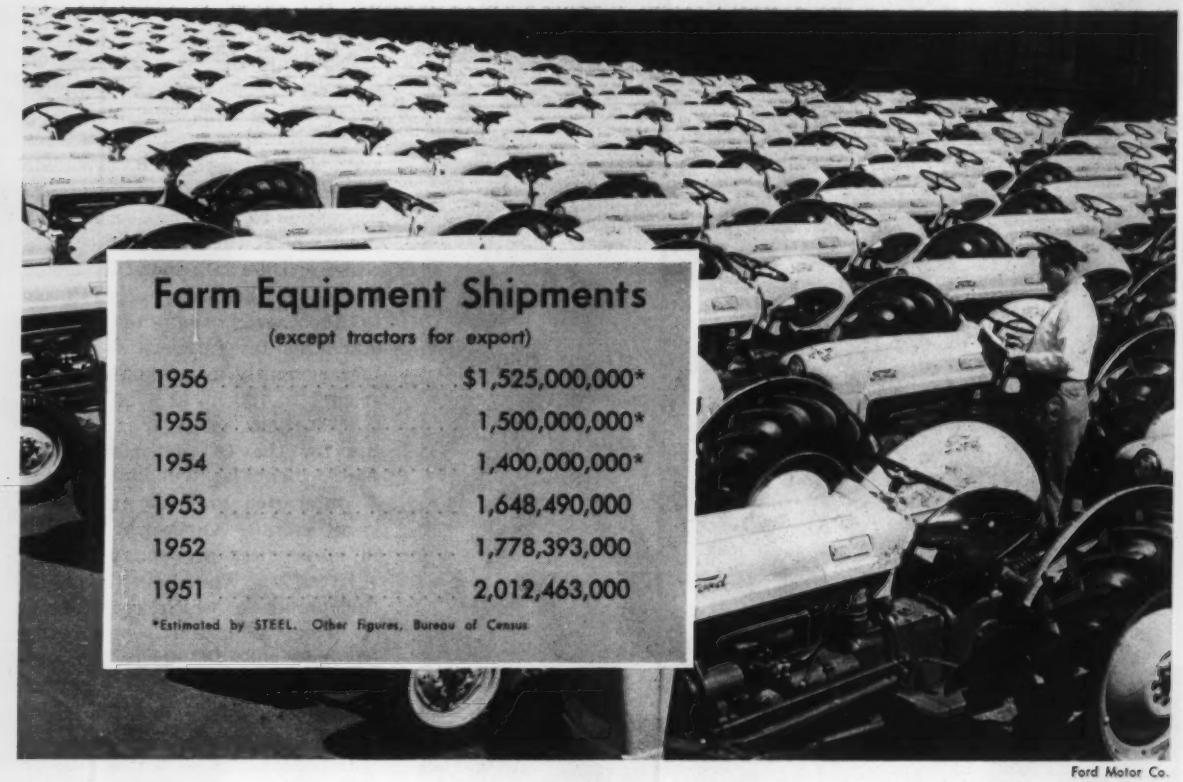
P. D. Ross, manager of marketing for the DC department, reports: "Machine tool builders will be interested to know that there is an average 33-per-cent increase in horsepower per pound."

He adds: "We believe that if all the processes which could benefit from adjustable speed were equipped with DC drives, the productivity of American industry could be increased by at least 10 per cent."

**Improvements** — Three design objectives, based on present and future industrial needs, have been achieved: Added versatility, reduced and simplified maintenance and improved appearance.

Versatility of the new line, say GE officials, will assure acceptance. Reason: Many of the electrical and mechanical features which previously made certain DC motors "specials" are incorporated in the standard Kinamatic line.





**Farm Equipment Shipments**

(except tractors for export)

| | |
|---|---|
| 1956 | $1,525,000,000* |
| 1955 | 1,500,000,000* |
| 1954 | 1,400,000,000* |
| 1953 | 1,648,490,000 |
| 1952 | 1,778,393,000 |
| 1951 | 2,012,463,000 |

*Estimated by STEEL. Other figures, Bureau of Census

Ford Motor Co.

*Sales of tractors, other equipment were up in '55, but . . .*

# Will '56 Farm Market Hold?

FARM EQUIPMENT manufacturers predict their 1956 dollar volume will be at least equal to last year's, although they expect unit sales to lag slightly. With farm income probably down 5 per cent this year, there will be fewer sales and farmers may have to pay a little more for new equipment.

**Forced**—Most producers report they have been forced to raise prices about seven per cent during 1955. Intensified competition within the industry should have a tendency to hold prices firm this year. Irving A. Duffy, vice president and general manager, Tractor & Implement Division, Ford Motor Co., believes new model introductions to be especially important in the 1956 sales picture.

Accelerated sales effort is the word all along the farm equipment line. Besides new products offered, stepped-up parts sales and intense dealer merchandising campaigns will be important.

**Reversed**—Last year's increase in sales reversed a three-year trend. Tractor shipments, which generally account for one-third of the industry's total volume, were about 335,000 units, 85,000 above the low of 1954. Sales of other equipment showed a slight increase.

Paul M. Mulliken, executive director, National Retail Farm Equipment Association, points out that the efficient, mechanized farmer is still making good money; it's the marginal farmer who is standing the loss of income.

**Unsettled**—Little real pessimism is expressed by manufacturers. R. S. Stevenson, president, Allis-Chalmers Mfg. Co., declines to make any predictions about 1956 until the "unsettled farm market conditions can be better interpreted," but he says his firm's sales have increased each year for the past three. Oliver Corp. reports sales up 41 per cent in 1955. Company officials, however, say it will be "difficult" to maintain the same level this year.

Anticipating 1956 sales equal to or better than 1955's, New Idea Equipment Co. believes an increase might come in sales of lower-priced equipment such as soil-building machinery.

**Agreed**—It is generally agreed that increased mechanization is the only way to lower farm production costs and increase profits. Some 21 million farmers produced more food in 1955 than 30.5 million farmers did in 1940. Experts estimate that by 1975 the farm population will be 15 million.

John T. Brown, president, J. I. Case Co., reports 1955 sales up 15 per cent from 1954, and the farm income "still a very substan-

tial figure," bearing out the manufacturers' generally unpessimistic outlook. Farmers are investing 8 per cent of their gross income in new and used machinery today, in contrast to 5 per cent before World War II.

**Spring Orders**—Orders for machinery which farmers will need for their spring work are satisfactory, according to John L. McCaffrey, president, International Harvester Co.

Looking for 1956 to be comparable to 1955, C. P. Milne, executive vice president, Massey-Harris-Ferguson Inc., points to the constant improvements in the capacity and efficiency of farm machinery as important factors to the improvement of the farmer's net income.

## Big Diesel Order

Louisville & Nashville Railroad has bought 56 additional diesels for delivery by April next year. Cost is pegged at $9.3 million.

John E. Tilford, president, said that the new engines will complete dieselization of facilities, though some of the more powerful steam locomotives may be held in reserve for special or emergency service.

Alco Products Div. of General Electric Co. will supply 28 diesel units of 1600 hp for freight service. Electro-Motive Div. of General Motors Corp. has the contract for four 1200-hp switchers and 24 1750-hp freight engines.

## Trailer Production Estimates

The forecast for the truck-trailer industry continues to be highly optimistic, says Prof. Marvin J. Barloon, Western Reserve University, Cleveland.

Average annual production of commercial-type trailers will be 97,000 for the period, 1956-1960. A new high of 78,500 was hit in 1955. Professor Barloon estimates 114,000 per year from 1961 through 1965; about 143,000 per year from 1966 through 1970; and 165,000 from 1971 through 1975. He bases his estimates given to the Truck-Trailer Manufacturers Association Inc. on a study done for the Aluminum Company of America.

### 1955 Intercity Freight Traffic

| Carrier | Ton-Miles (millions) | Per Cent increase over 1954 |
|---|---|---|
| Railroads | 620,000 | 10 |
| Trucks | 244,600 | 14 |
| Oil Pipe Lines | 196,500 | 9 |
| Inland Waterways | 87,500 | 6 |
| Airlines | 178 | 22.5 |

Estimates by Chamber of Commerce of the U.S.

# Freight Shipments Rise

THE OUTLOOK for transportation is promising. So says the U. S. Chamber of Commerce after noting that ton-miles rolled up by freight carriers last year far exceeded 1954 totals (see table).

The chamber expects automakers to spend over 50 per cent more this year for plant and equipment than in 1955. It says rail expenditures are likely to be up at least 25 per cent. Other spending for transportation will be up 10 to 16 per cent.

**Railroads**—Carloadings in 1955 hit 37.8 million, up 4 million from 1954. Revenue ton-miles were 620 billion, 12.9 per cent over 1954.

In 1955, freight car output rose while locomotive and passenger car production decreased. For 1956, the chamber predicts construction will hit $400 million, 18 per cent over 1955. Capital expenditures will top 1955's $870 million by 20 per cent.

**Next Five Years**—The chamber sees: Production of 375,000 freight cars costing $525 billion; $365-million worth of roadway structures, terminal yards and communications; spending of $310 million for rolling stock; and a capital expenditure program averaging $1.2 billion a year.

**Trucks**—Operating revenue last year totaled about $5.4 billion, 14 per cent over 1954's. Spending for new equipment was $2.5 billion, up 12 per cent. New equipment spending should climb to $3 billion this year, says the chamber.

**Shipping**—Roll-on roll-off trailer ships may be the key to a comeback by intercoastal ship lines. Seven of the vessels are expected to be built soon.

America's share of the world's tanker capacity, now 20 per cent, is expected to climb to 30 per cent when the present supertankers are completed.

Supertankers already have doomed a projected pipeline from the Gulf to the North Atlantic states. One tanker on this route hauls 271,000 barrels a trip. (Construction of new oil lines last year was 500 miles under that in 1954.)

More than 700 inland waterway craft were launched last year. The 85 inland shipyards have backlogs up to two years. More than 500 new plants selected waterside sites in 1955.

**Air Freight** — Along with the boost in domestic freight was a 11-per-cent boost in international freight, bringing it to 91 million ton-miles last year. One industry leader predicts air freight will total $200 million in revenue and 1 billion ton-miles a year within ten years.

*A buyers' guide shapes up as . . .*

# BDSA Surveys Tool Shops

TOOL AND DIE BUYERS will get an assist if a current Business & Defense Services Administration census of the 3000 contract tool and die shops is successful.

BDSA's Metalworking Equipment Division will catalog location, production facilities and products of each tool and die producer. There's a good chance the material will be published and made available to industry. It's expected that the data will be particularly valuable as a "Where To Buy It" guide for defense contractors and military purchasing people.

**Double Duty**—But that would be just a side benefit. The survey's main purpose is to give defense planners a better idea of the tool and die industry's capabilities so that they can be fitted into the over-all mobilization program.

Especially needed are data on the industry's ability to supply components for large machine tools, extrusion presses and closed die forging presses—information that is incomplete now and would be of vital need in an emergency.

A similar study will be made of metal cutting tool makers.

## Navy Ship Plans O.K.'d

A Navy shipbuilding program estimated at $1.4 billion passed the House by a record 358 to 3 vote. The bill, now in the Senate, provides for construction of 23 new ships, 5000 tons of landing craft and modernization and conversion of 23 older vessels.

Included are a 60,000-ton *Forrestal* Class aircraft carrier and an 11,000-ton nuclear powered guided missile light cruiser. Funds must be provided in a yet to be considered authorization bill.

## Atom Projects Proposed

At least two publicly owned electric utilities have offered to build nuclear power plants under the Atomic Energy Commission's small reactor demonstration program.

Piqua, O., proposes a 12,500-kw plant using an organic moderated reactor. Holyoke, Mass., would build a plant using a 15,000-kw closed cycle gas turbine and a gas cycle reactor.

Even though civilian atomic industry shows promising signs, it will be 1965 before atomic power will become really competitive in the opinion of a board of nongovernment experts reporting to the Joint Senate-House Committee on Atomic Energy.

The experts did say, though, that by 1975 atomic power might equal 40 per cent of present electrical output and by 1980 could be producing more than the entire power industry turns out today.

## GSA Plans a Sale

Palm oil, some 20 million lb of it, will be sold by General Services Administration beginning Aug. 6. Sales will be at intervals so as to "not disrupt usual markets."

The oil is now in the national stockpile of strategic and critical materials, but development of substitutes for palm oil has reduced stockpile needs.

## Here and There

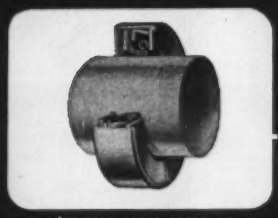
Senate Small Business Committee will "study": Import and offshore procurement of machine tools, material shortages, military procurement, the impact of the renegotiation act on small business . . . Post Office would like a 5-year plan for $80 million for construction and modernization of buildings plus labor saving equipment . . . By Mar. 1 the Labor department will open 25 new Wage-Hour field offices to aid employers and employees affected by the $1.00 minimum wage which goes into effect on that date . . . Bills have been introduced into both Senate and House to encourage construction of modern Great Lakes bulk cargo vessels. Present building of lake boats isn't enough to keep the fleet up-to-date nor to support an adequate work level in lake shipyards, say supporters . . . Office of Technical Services notes sales of government research reports last year were up 65 per cent over 1954. The reports cover military, Atomic Energy Commission and other government research.

**Meet George A. Fowles:** He's Director, Chemical & Rubber Division, Business & Defense Services Administration, on loan to the government for six months from B. F. Goodrich Chemical Co.

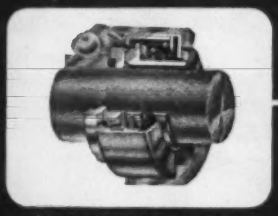
At several times in his career, Mr. Fowles has worked closely with the wire industry. During World War II, it was in developing the use of polyvinyl chloride resins. His first job after graduating from Massachusetts Institute of Technology was developing rubber electrical insulation at Anaconda Wire & Cable Co.

In Washington, he can be reached at Room 4425, Commerce building. Phone: STerling 3-9200, ext. 4843.

# FOR PERFORMANCE PROTECTION

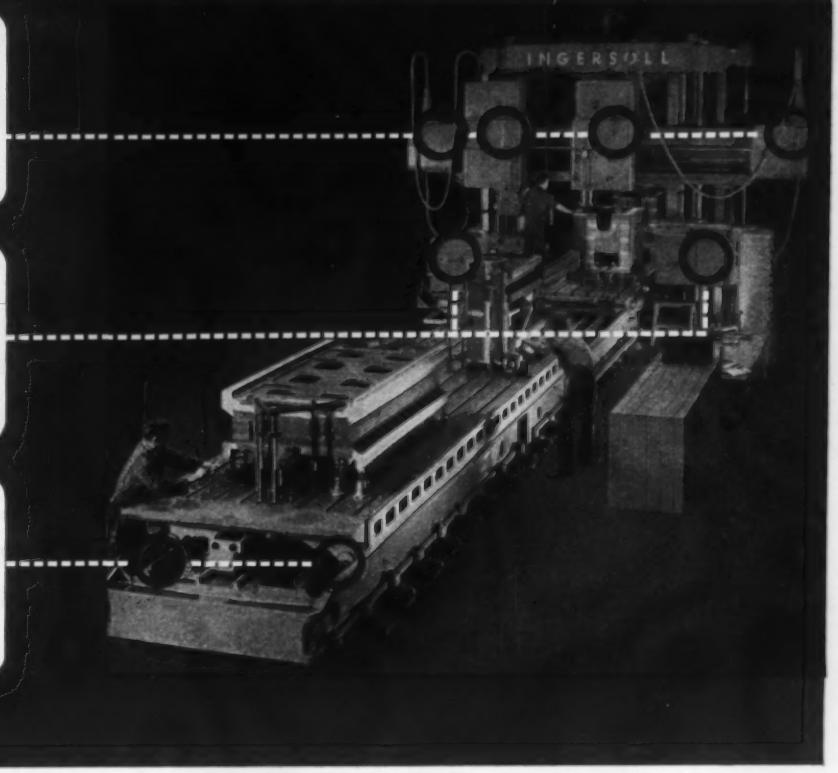


C/R SHAFT SEALS



C/R END FACE SEALS

C/R SIRVENE WAY WIPERS




Which seal is the best answer to your problem? C/R Engineers know. They've helped machine tool builders solve tough sealing problems—successfully—for years.

**C/R SHAFT SEALS** deliver outstanding sealing performance and service life on medium speed shafts, gear cases and drive mechanisms. They seal lubricants, exclude chips, coolants, abrasives—and require minimum radial and axial space.

**C/R END FACE SEALS** are lapped to micrometric tolerances to provide absolute lubricant retention and exclude chips, coolants and all foreign materials on high speed spindles, shafts and drives under the most critical service. Normally they operate throughout the entire life of the machine tool.

**C/R SIRVENE WAY WIPERS** give maximum protection to sliding assemblies under long and continuous operation, and will not lap or mark rails. Available in metal-cased, spring-loaded, and plain designs for flat, angular and circular ways.

*More automobiles, farm and industrial machines rely on C/R Oil Seals than on any similar sealing device.*

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# Have You Heard the Latest • • •

## about the finest general ~~purpose~~ production milling machines?

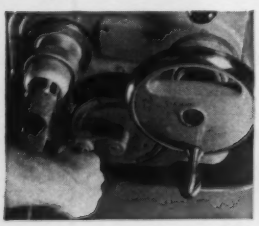
CINCINNATI ML and MI Milling Machines always were considered the finest equipment for toolroom work. Now they're better than ever before, and in addition, plain and vertical machines are available with or without automatic table cycles. And for a little more, automatic cycle machines can be equipped with automatic spindle stop. There you have the story in a nutshell.

Size, style and automatic features are related in the following manner:

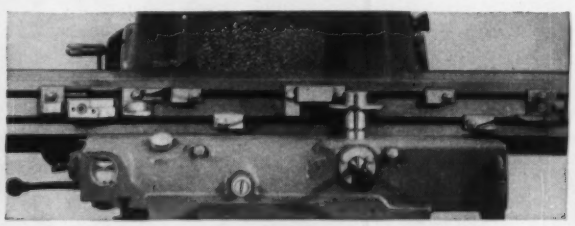
New Nos. 2ML and 2MI Plain; built as toolroom millers, or as production millers with no loss of versatility. New Nos. 2ML and 2MI Universal; fine toolroom millers equipped with a new design Cincinnati Dividing Head (no automatic cycle). New No. 2MI Vertical; a toolroom miller, or production miller with no loss of versatility.

Three Cincinnati features of value in lowering your costs are illustrated here. Of course, there are many more, all of which are outlined in the new CINCINNATI 2ML and 2MI catalog, No. M-1916. Write for a copy, or telephone our nearest agent or office.

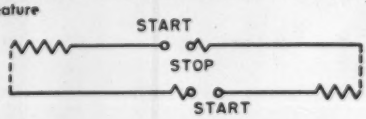
**THE CINCINNATI MILLING MACHINE CO.**
**CINCINNATI 9, OHIO**



A crank-type control at front of knee, makes selection of feeds quick and easy.



Automatic reciprocal milling setups, with center safety stop, may be assigned to Automatic Cycle Machines. That's because automatic backlash eliminator is a standard feature



Enclosed electrical controls. Individual motor for feed drive.

# CINCINNATI

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*Management at Work*

# Crucible's Day Develops Central Lab

"PROGRESS in research is a must in a leading specialty steel corporation."

So says Dr. Maurice J. Day, vice president and director of research and development, Crucible Steel Co. of America, Pittsburgh. He has the responsibility to develop a complete metals research laboratory to provide new and improved alloys.

**New Lab Needed**—Dr. Day's appointment in December, 1954, accelerated the move toward establishment of a central research department at Crucible. Reports Dr. Day: "We plan a well-integrated facility to give Crucible scientific leadership and to apply our knowledge where the industrial economy or defense needs demand it.

"We believe in automation of the batch process of making steel. We believe in statistical studies. We need a broad horizon of knowledge from ceramics to metallurgy, and we need to know how to apply that knowledge," Dr. Day explains.

**Target**—"Our principal aim is higher quality products at lower cost for the commercial market," he continues. "We must also be prepared to meet difficult requirements of any defense program."

When Dr. Day talks of defense demands for alloy steels, his background includes consulting service with the American Ordnance Association. He is also a director of the Defense Orientation Conference Association.

**Experience**—He received a doctor's degree in physical chemistry from Michigan State College in 1937 and served as physical chemist and assistant metallurgical engineer for U. S. Steel Corp. He left U. S. Steel in 1952 to join the Armour Research Foundation of Illinois Institute of Technology as assistant director. He resigned this position to join Crucible in 1954.

Dr. Day stresses leadership by research men. "Scientists provide guidance at Crucible. That's the way an industry progresses—by taking ideas and putting them to work. We need men who can apply their knowledge to the company's specific problems and goals.

"We will have basic and applied research," continues Dr. Day. "Our research will extend from the laboratory to the 'firing line' of plant operations."

**Broader Horizons** — Crucible's interests are steadily widening, ranging from vacuum metals to titanium. Progress in research leads the way.

Apart from his duties, Dr. Day is a member of numerous societies and honorary scientific fraternities. He's an author of many technical papers. He and Mrs. Day are parents of a son and two daughters.

*New application, more use by small companies bring . . .*

# Lift for Truck Sales

"WE EXPECT one of our best years for sales of electric and gasoline-powered trucks in 1956." So says William Van C. Brandt, managing director, Industrial Truck Association, Washington, after scanning reports from 17 leading manufacturers. Most look for sales this year to be about 10 per cent above last year's.

"Expansion in such varied activities as lumber, steel and government warehousing created a good sales year in 1955, and this year will be better," continues Mr. Brandt. Statistics of the U. S. Bureau of the Census show 5030 electric truck units were shipped in the first 11 months of 1955, compared with 4947 units shipped in all of 1954. Some 24,510 gasoline-powered trucks and tractors were shipped in the first 11 months of 1955.

**Widening Applications** — New waves of steel expansion bring an accelerated need for trucks to speed materials and metals, points out the Yale Materials Handling Division, Philadelphia, of Yale & Towne Mfg. Co. That's only half the story. This mainstay of the materials handling field is indispensable in other growing areas.

A boom in any major consuming industry will boost industrial truck sales. A boom in purchases by "smaller companies that have used little or no handling equipment is already helping business prospects," says Howard Palmer, vice president and general sales manager of Lewis-Shepard Products Inc., Watertown, Mass. Partly on the strength of that, "we anticipate that 1956 will be the biggest year in our history."

**Gas or Electric?**—For most long hauls or operation over rough roads, buyers select gas-powered trucks. Manufacturers say their vehicles can handle 99 per cent of all truck applications. Electric trucks serve mainly in short hauls and operations with frequent stops. Electric trucks are used in confined areas where gasoline fumes might be objectionable. Producers such as Elwell-Parker Electric Co., Cleveland, say low fuel and maintenance costs make up for any additional cost of electric trucks.

**Getting Particular** — Knowing the advantages of the proper use of trucks, customers are growing more selective. Says a purchasing agent for a large Pittsburgh steel firm: "Standard trucks are fine for most applications, but we have many special needs. We should have better means for handling hot materials at low cost."

The producers' answer to these requests is a series of performance improvements. "The trend is toward automatic transmissions, power steering, faster load lifting and special permanent and exchange attachments," summarizes R. H. Davies, vice president, industrial truck division, Clark Equipment Co., Battle Creek, Mich.

**More Improvements** — Officials of Raymond Corp., Greene, N. Y., point out that electric platform trucks prove their value to metalworking plants by operating in such narrow areas as 6-ft aisles.

"Each industry using the basic fork-lift truck has its own requirements," G. B. Davis, director of sales, Baker-Raulang Co., Cleveland, points out. His firm serves 37 separate industries. Providing each customer with what he wants demands special designs (such as sideloading fork trucks) and new attachments (for such tasks as picking up and stacking four drums at once).

# New Mill for Germany

**To meet chronic shortage of cold-rolled products, German company gets continuous mill from the U. S. It's to be operated under 10-year agreement with Armco Steel Corp.**

GERMANY and the United States continue to cement trade relations. Latest evidence: A 66-in. continuous cold reduction mill soon to start up at August Thyssen-Huette A. G., Duisburg-Hamborn, Germany.

Rolling equipment is being supplied by Continental Foundry & Machine Co., East Chicago, Ind., where it's been under erection for the last three months. The mill will be rated at more than 20,000 tons a month, and is to be operated under a 10-year licensing agreement with Armco Steel Corp., Middletown, O.

**Preparation** — Fifteen Thyssen steel workers, now returning to Germany, have had three and a half months' intensive on-the-job training at Armco. They will act as trainers of other Thyssen employees.

The new mill is the only continuous cold reduction unit in Germany, though there are others in Europe. Thyssen produces about 1.5 million tons of ingots annually. By 1958, it hopes to be back up to prewar capacity of about 2.5 million tons. It's 12 months since Thyssen's 66-in. continuous hot strip mill started up.

**Co-operation** — Thyssen maintains a "technical service arrangement" with Armco International Corp., under which "consultant services are given on a fee basis for engineering, building and operating foreign-owned steel plants."

A. R. Edwards, president, Armco International, says similar technical agreements are in effect with companies in Argentina, England, Italy, France, South Africa, Mexico and Japan.

Bessemer converters will be used to produce some of the steel for the new German mill. It will be made by the Austrian "L-D" process, using oxygen and steam in the converter.

## Orders Pile Up

German steel order backlogs are still climbing. In rolled products, they're above 6 million tons, of which 1 million is for export.

Despite domestic demand for steel, however, German interest in export orders is picking up. Premiums of $12-$15 a ton are readily available for ship plates, bars and structurals. All European mills are sold out of ship plate to 1960.

## Expansion Notes

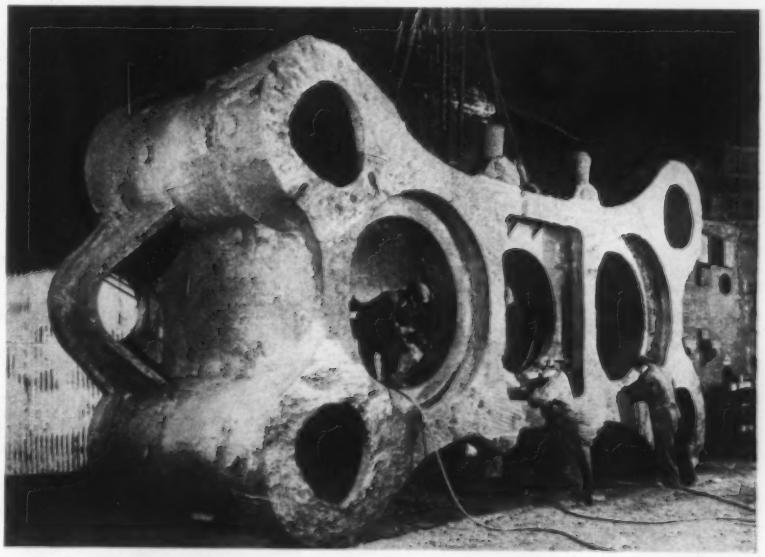
In Britain, a new blast furnace was blown in last month at the Margam Works of Steel Company of South Wales. Its capacity is over 10,000 tons a week and it cost $15 million plus. Engineering is still enjoying boom conditions, with over 10 million sq ft of manufacturing space added to Midlands plant alone.

Significant notes: Caterpillar Tractor Co. to build a 1500-man plant in Scotland . . . Samuel Fox & Co. Ltd., Sheffield, orders a $600,000 electric furnace, plans new blooming, billet finishing and combination bar and rod mills.

## Switch in Ships

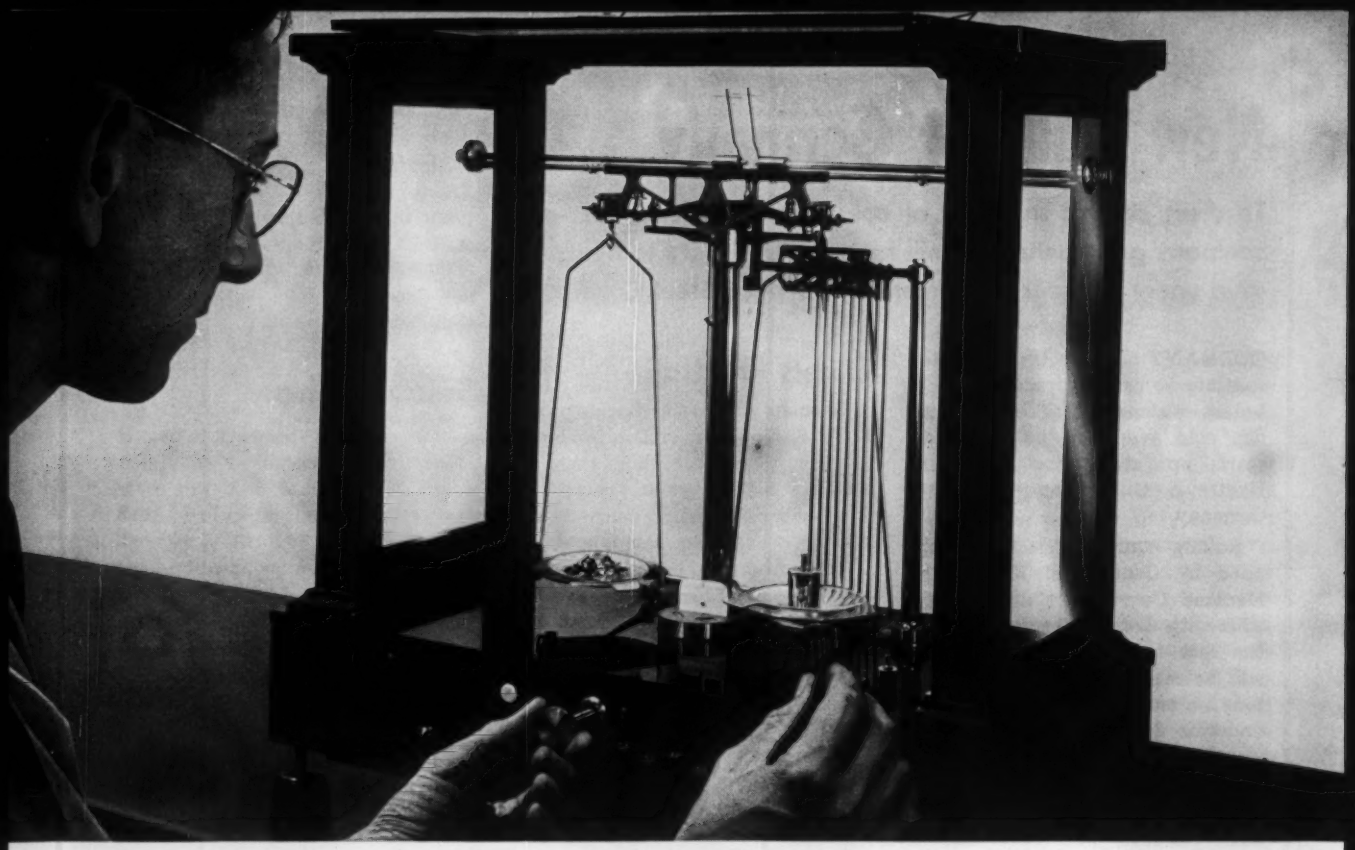
Japan is now the world's second largest commercial shipbuilder. *Lloyd's Register of Shipping*, London, reports she had 831,000 tons under construction at yearend. That's a gain of 250,000 tons for the year.

Britain is unchallenged in first place, with 2.3 million tons, though she gained only 79,000 from the previous year. Germany ranks third with 748,000 tons, up 34,000; Holland next with 509,000 tons, down 69,000. All remaining countries had less than 500,000 tons in the building. As of last October, Shipbuilders Council of America, New York, reports that a world total of 13.8 million tons was being built. America was in tenth place, with 258,000 tons.



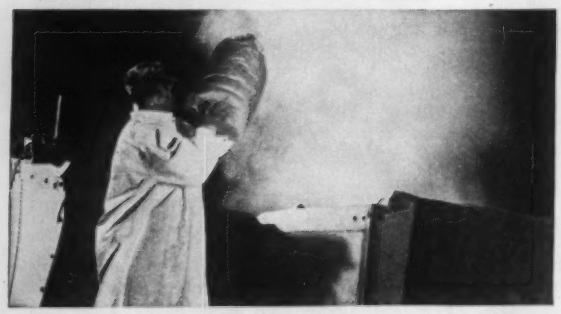
**British Firm Produces Its Largest Casting**

Six furnaces were necessary to produce the steel for this casting made by English Steel Corp., Sheffield, Yorkshire, England, for a forging press entablature. It is 28 ft 6 in. long, 14 ft 2 in. high and 8 ft 6 in. wide, but weighs 19 tons less (166 tons) than the previous largest made by the firm



# How Great Lakes Steel *weighs* quality

IN A QUALITY CONTROL LABORATORY, chemical analyses such as these, are run on every heat. Then . . .



THE ANALYSES are telautographed immediately to the melter so he can add elements to meet customer's requirements.

How much does quality weigh? In the photograph above, a test sample is being weighed for chemical determinations. Tests like this give our open-hearth operators a running check on molten steel while it is still in the furnace; enable them to pour heat after heat of high and uniform quality.

In every department at Great Lakes Steel, from raw material docks to delivery of finished steel, the emphasis is on quality—on seeing that customers receive steel that meets their particular requirements.

Do you have a manufacturing problem involving flat-rolled steel? A call to Great Lakes will make available to you the experience of our entire organization.

**GREAT LAKES STEEL CORPORATION**

Ecorse, Detroit 29, Michigan • A Unit of

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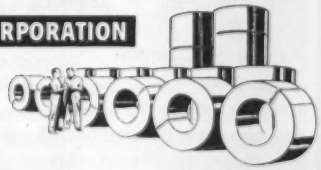

*District Sales Offices:* Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

Chevrolet body bolt holes are pierced simultaneously in frame brackets

# New Twist in Frames

CHEVROLET'S 500,000th passenger car frame recently rolled off the line at the division's frame and stamping plant, Flint, Mich.

Radical changes in the construction of the box-rail frame point the way to new methods of construction, says R. B. Dow, operation manager.

Chevrolet turns out its frame rails on a tube mill; transposes them into box shape through a "Turk's head." Then they are moved to cold bending machines which give them the required shapes. Here's how it works.

**Tubing**—A roll of standard gage strip steel is run through a conventional tube mill operating at speeds up to 150 fpm. Seven forming rolls curl it into a tube and ready it for a rotary resistance welder. After welding, the tube continues through three sizing stations and two-station "Turk's head." These five steps square the tube into a 4 x 4½-in. box girder.

As the rectangular rail section comes from the "Turk's head," a flying cutoff saw whirling at a surface speed of 24,100-fpm slices it into 204-in. lengths. A cutoff press then halves these sections into the two main side rails of the frame.

**Forming**—From the cutoff press, front side members (rails) are conveyed to a hydraulic forming machine. A two-step expanding mandrel transposes the front end of the forward rail section to get depth of section and added vertical beam strength. As one side member is being reformed, an automatic shuttle-type crossfeed loads a second rail into position. Each machine has dual loading magazines.

**Bending**—Although the tube mill is largely responsible for high speed output (250 frames an hour), the key to the operation lies in cold bending machines which put five bends into the front frame section alone, two of them superimposed on each other.

The problem here is to avoid buckling or wrinkling the box tubing. An internal mandrel, operating under hydraulic pressure, is pushed into the tube. A secondary "articulated" mandrel wedges forward to fill the inside. In this way, the tube can be bent without buckling or collapsing.

Maintaining the hardened steel mandrels is a job in itself. One of the larger ones contains 70 jointed parts. Tube rejects, which are few and far between, usually are caused by undergage or overgage metal. Undergage leaves an oversize inner tube diameter which the mandrels cannot fill. If the wall thickness is over maximum dimensions, the mandrels cannot enter. The bending stations are among the few places where each part is positioned and loaded by hand.

While the front rail sections are being formed, a second line is turning out 51-in. rear end frame rail sections (2¾ x 3½-in.). Front and rear frame sections are fabricated as separate subassemblies. They are later joined with a smaller conventional center section using standard welding methods.

**Assembly**—After bending, most other assembly operations follow the regular pattern. Six clip holes are drilled in the left hand rail sections, 17 in the right. The three frame sections are resistance flash welded and brackets are projection welded.

Of the 44 pieces in each frame, only the two rear spring hangers are castings. Side rails are formed

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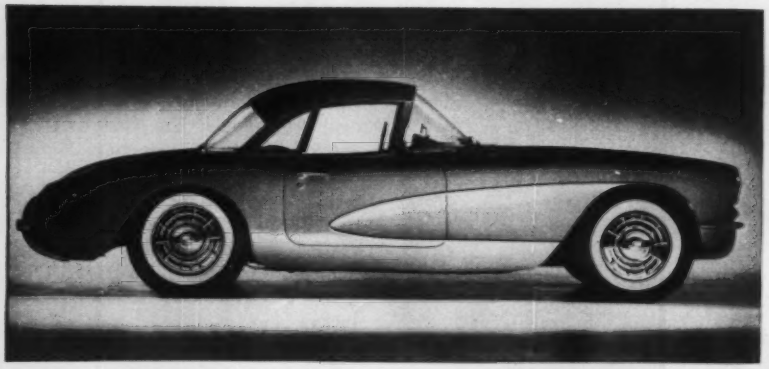


Restyled 1956 Corvette boasts 225-hp V-8. It's available with either convertible top or removable hardtop. It holds NASCAR flying mile and standing start crowns

on the tube mill, and all other parts are stampings.

**Piercing**—After all brackets have been given a final insurance welding, the nearly completed frame automatically is conveyed to a Danly piercing machine.

It drops into a self-equalizing jig which corrects any slight form deviations. Hydraulically operated "C" guns then pierce 12 body bolt holes (1 9/32-in. in diameter) simultaneously. Normally, these holes are pierced or drilled before bracket welding, and, too often, positioning errors aren't discovered until the body drop during final assembly.

**Painting** — After leaving the piercer, a half-mile conveyor line carries the frame overhead through a washer, dryer, paint booth, drain section and baking oven before dropping it off at the loading dock. The complete operation (from washing through baking) takes 34.4 minutes.

**Roundup** — Chevrolet started building frames in the Flint plant in December, 1954, several months before it was scheduled for operation. One of the cleanest plants in this area, it easily can serve as a model for many of the slap-dash assembly lines typical of the fast pace set by harried automakers.

The frame section of the plant uses 5512 tons of steel each month and return 892 tons of scrap. It covers 366,000 sq ft and has 11,008 ft of conveyors. The 275,000-sq-ft stamping section uses 10,488 tons of sheet steel each month to turn out fenders and hoods by conventional stamping methods.

## GM Boasts Record Year

General Motors Corp., Detroit, reports 1955 net earnings of more than $1 billion.

Harlow H. Curtice, president, says this is the first time that GM has gone over the $1-billion mark. He points out that net sales rose to $12.4 billion, 27 per cent over 1954 and 24 per cent above 1953—a previous record sales year. Taxes will be about $1.6 billion.

Looking ahead to 1956, Mr. Curtice claims that GM does not plan to build a smaller automobile, even though rumor has it one of the Big Three plans to bring out such a model later this year.

## U. S. Auto Output

Passenger Only

| | 1956 | 1955 |
|---|---|---|
| January | 611,190† | 659,719 |
| February | ..... | 675,769 |
| March | ..... | 794,188 |
| April | ..... | 754,007 |
| May | ..... | 724,891 |
| June | ..... | 649,372 |
| July | ..... | 659,979 |
| August | ..... | 614,392 |
| September | ..... | 461,592 |
| October | ..... | 517,669 |
| November | ..... | 748,559 |
| December | ..... | 682,698† |
| Total | ..... | 7,942,983† |

| Week Ended | 1956 | 1955 |
|---|---|---|
| Jan. 7 | 125,245 | 150,585 |
| Jan. 14 | 149,995 | 155,109 |
| Jan. 21 | 144,729 | 161,150 |
| Jan. 28 | 135,586 | 160,666 |
| Feb. 4 | 141,845† | 164,265 |
| Feb. 11 | 143,000* | 168,059 |

Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

## Roton Bearing Gives a Lift

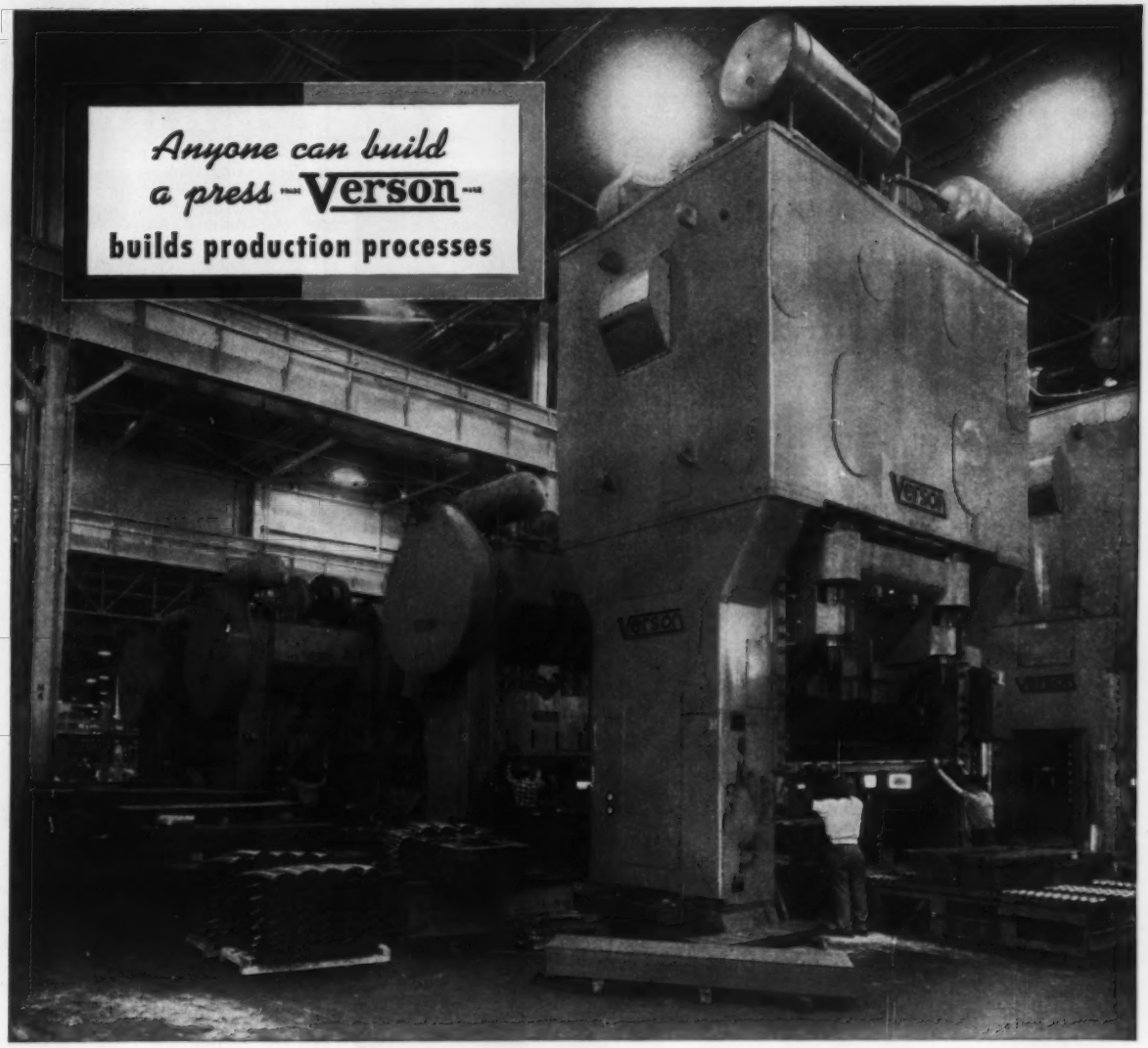
A miniature mechanical torque converter which works without gears has been developed by the Anderson Co., Gary, Ind.

Called a Roton, this toroidal antifriction bearing acts both as a rolling surface and a working part. It is motor driven and replaces complicated and expensive hydraulic lifting and moving devices.

Ralph Wise, chief development engineer of Anco's Roton Division, says the bearing looks like a small dumbbell about the size of a peanut. It is responsible for moving many of the mechanical parts (ventilators and flaps) on GM's Firebird II.

## Exhaust Notes

Final tally by the Automobile Manufacturers Association, Detroit, shows that 7,920,133 passenger cars and 1,249,011 trucks and busses were sold by U. S. factories in 1955. Official total: 9,169,144. . . . Sen. "Mike" Monroney (Dem., Okla.) has warned NADA members that bootlegging, phantom freight, bad factory relationships and one-sided contracts, unsound credit terms and phoney advertising are the evils of the auto industry . . . Roy Fruehauf, president, Fruehauf Trailer Co., Detroit, reports that 1956 expansion plans call for factories near Atlanta, Ga., in Texas and on the West Coast. He forecasts a 70-per-cent sales jump for next year. This year's sales: $23 million . . . Here's the latest slogan from Detroit: "A careless driver is an accident going somewhere to happen" . . . Hardtops, two and four door, look like the industry's doublebarreled sales weapon this year. In January, nearly 100,000 or 15 per cent of cars made were four-door hardtops. Only 242,000 four-door hardtops were made all last year. The two-door hardtop is now the second most popular body style. Last year it nosed out the two-door sedan by grabbing 21 per cent of sales . . . Station wagon production, 12.1 per cent last year, is headed higher.




**2500 ton DOUBLE ACTION PRESSES... key units in this 100%**

**TRADE —Verson— MARK**

**press room**

In the plant in which this photograph was made, 47 Verson presses are now in service and preparations are being made for seven more . . . a 100% Verson-equipped production process!

Building production processes is Verson's business. Anyone can build a press . . . it's what that press can be made to do as a part of an integrated process that is important. In over thirty years Verson has produced processes incorporating virtually all types of standard and special presses. All of this experience and know-how goes into every press that Verson builds.

Whatever your production problems, if they involve the press forming of metals, bring them to Verson. Here your press requirements will be treated as an integrated part of your whole production process. As a manufacturer of practically every type of press we can recommend, without prejudice, the combination of machines that will best fit your over-all requirements.

To put these facilities to work for you, just send an outline of your needs.

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ONE OF A SERIES . . .

# What makes a cylindrical roller bearing good?

# The RIGHT ROLLER DESIGN and QUALITY CONTROL

The design and quality of the *rollers* play a large part in the performance of a cylindrical roller bearing. At right are some of the vital factors which must be considered.

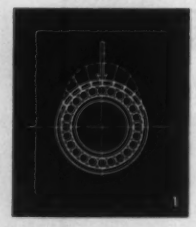
All these factors are scrupulously controlled by the most modern precision equipment to insure maximum performance and life for every HYATT Roller Bearing. You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your requirements. Remember, HYATT is America's *first* and *foremost* maker of cylindrical roller bearings. Hyatt Bearings Division of General Motors, Harrison, New Jersey.

GM GENERAL MOTORS

HYATT ROLLER BEARINGS

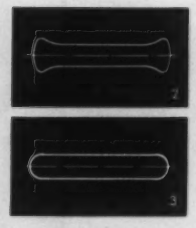
## 1. DISTRIBUTION OF LOAD WITHIN THE BEARING

Rollers are subjected to load only while in the "load zone," with maximum load while on the line of action of the bearing load, as shown in diagram 1. The theoretically perfect "load zone" extends from −90° to +90° from the line of action, but this is neither practical nor necessarily desirable. Under normal loadings, the actual "load zone" may range from 90° to 120°, depending on load and mounted internal clearance. This distributes the load so the load on the heaviest-loaded roller is approximately 5/N times the bearing load, where N is number of rollers.



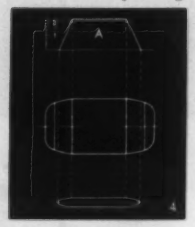

## 2. DISTRIBUTION OF LOAD WITHIN ROLLER'S AREA OF CONTACT

A cylinder deflects locally in the region of engagement when loaded between flat plates. The plate also deflects, so the original line of engagement is broadened into a "dog-boned" area under load, as shown in diagram 2. Moreover, deflected cylinders must gather in metal at their ends in *two planes, and this end-loading effect can seriously reduce the life of a cylindrical roller bearing.* All HYATT rollers have generous corner radii or blended chamfers to reduce end effect; and all HYATT Hy-Load rollers also have crowning to allow the contact area to "fade out" evenly (diagram 3).



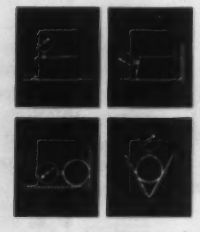

## 3. DISTRIBUTION OF LOAD ACROSS ROLLER

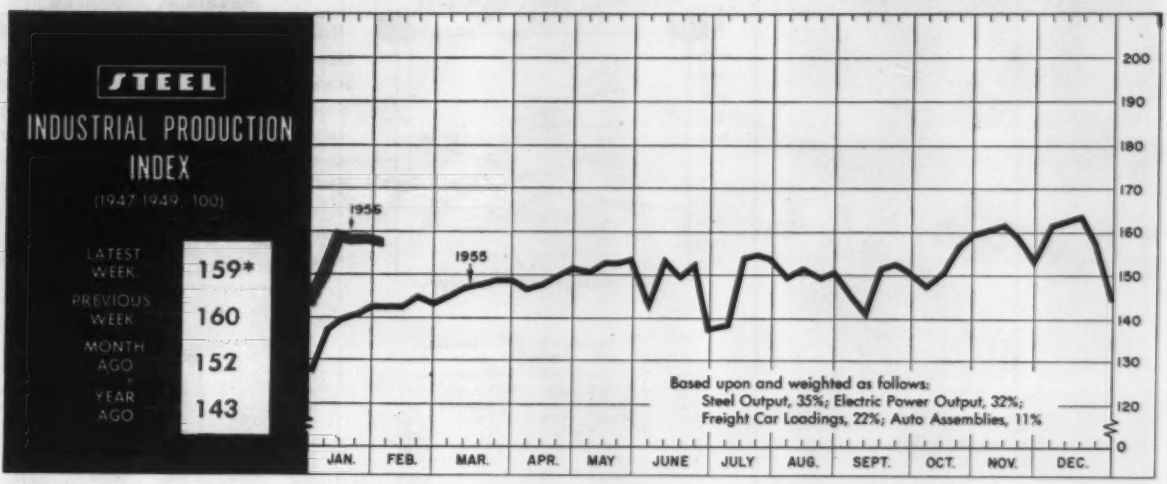
The unit load on any roller is uniformly distributed axially except at the crowned ends where it drops off to zero as shown in diagram 4. The summation of unit loads represented by area A is the total roller load. This same load under misalignment results in an area equal to area A; but maximum unit load is considerably greater and the bearing will have a shorter life than a properly aligned one. When the same total load is applied to an *uncrowned* roller, an even higher unit load results. This demonstrates the value of crowning when misalignment occurs.




## 4. EFFECT OF ROLLER QUALITY ON BEARING PERFORMANCE

Lack of roller quality control has a very adverse effect on performance: 1. A roller with excessive *taper* tends to uneven load distribution and abnormal temperature rise. 2. A roller with excessive *end square* tends to noisy bearing performance. 3. A roller with excessive *two-point out-of-round* tends to poor segregation and poor bearing life. 4. A roller with excessive *three-point out-of-round* tends to noisy bearing operation. 5. A roller with *poor finish* tends to wear on all operating surfaces and noisy operation. 6. A bearing with excessive *roller-to-roller diameter variation* tends to poor bearing life. 7. A bearing with excessive *roller-to-roller length variation* tends to poor thrust capacity, abnormal temperature rise.






*Week ended Feb. 4

# Production Index Features Flat Look

"THE FLAT LOOK" not only describes Christian Dior's fashions but also the appearance of most business trend charts so far in 1956.

STEEL's industrial production index is typical. With the exception of the first week in January, the index has been within one point either way of 160 (1947-1949=100). This fortifies what most economists have been saying right along: Despite a slip in automotive production this year, the economy is going to remain strong. The rate of increase prevalent in 1955 is tapering off, but no serious overall decline is expected—not even in fourth quarter.

**Three Mainstays**—The level of the chart above is maintained by carloadings, electric power output and steel operations. The Association of American Railroads reports that carloadings for the week ended Jan. 28 totaled 691,850, which was 8.6 per cent above the corresponding week last year. Coal loadings will help keep the weekly figure near the 700,000-ton mark as the bituminous industry continues its resurgence. Production of coal in the first four weeks of 1956 is 6,214,000 tons ahead of the corresponding time in 1955, says the National Coal Association.

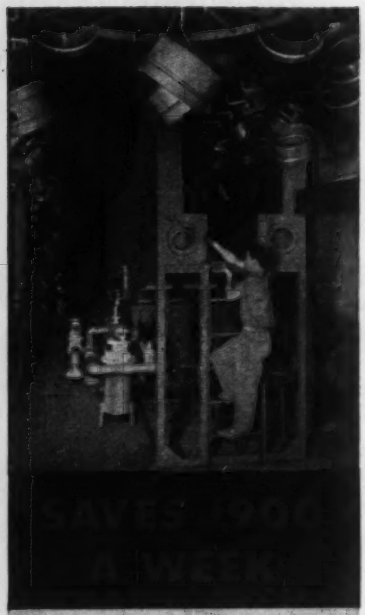
The nation's utility companies are maintaining their 15-per-cent advantage over a year ago in the output of electric power, says Edison Electric Institute. They produced 11.512 billion kwhr in the week ended Jan. 28. This was the fourth consecutive week the industry has gone above the 11 billion figure.

**More Ingots**—The rampaging steel industry, although failing to set its fourth consecutive weekly record, scored a near miss with 2,444,000 net tons of steel for ingots and castings, reports the American Iron & Steel Institute. The series of records started with the week ended Jan. 14, when 2,428,000 tons were produced, followed by 2,437,000 tons. Thus the latest week represents the second

## BAROMETERS OF BUSINESS

| | LATEST PERIOD* | PRIOR WEEK | YEAR AGO |
|---|---|---|---|
| **INDUSTRY** | | | |
| Steel Ingot Production (1000 net tons)[2] | 2,403[1] | 2,444 | 2,095 |
| Electric Power Distributed (million kwhr) | 11,520[1] | 11,512 | 10,047 |
| Bitum. Coal Output (1000 tons) | 10,360 | 10,540 | 8,835 |
| Petroleum Production (daily avg—1000 bbl) | 7,000[1] | 6,994 | 6,721 |
| Construction Volume (*ENR*—millions) | $532.9 | $362.3 | $279.9 |
| Auto, Truck Output, U. S., Canada (*Ward's*) | 175,753 | 169,263 | 190,140 |
| **TRADE** | | | |
| Freight Car Loadings (1000 cars) | 692[1] | 692 | 641 |
| Business Failures (Dun & Bradstreet) | 273 | 284 | 264 |
| Currency in Circulation (millions)[3] | $30,223 | $30,361 | $29,758 |
| Dept. Store Sales (changes from year ago)[3] | +8% | +3% | +2% |
| **FINANCE** | | | |
| Bank Clearings (Dun & Bradstreet, millions) | $21,071 | $22,164 | $22,044 |
| Federal Gross Debt (billions) | $280.1 | $280.3 | $278.5 |
| Bond Volume, NYSE (millions) | $24.9 | $24.3 | $19.6 |
| Stocks Sales, NYSE (thousands of shares) | 9,775 | 10,613 | 16,271 |
| Loans and Investments (billions)[4] | $85.2 | $85.5 | $85.7 |
| U. S. Govt. Obligations Held (billions)[4] | $29.5 | $29.5 | $36.4 |
| **PRICES** | | | |
| STEEL's Finished Steel Price Index[5] | 209.10 | 209.10 | 194.53 |
| STEEL's Nonferrous Metal Price Index[6] | 267.8 | 269.7 | 226.8 |
| All Commodities[7] | 112.0 | 111.7 | 110.4 |
| Commodities Other Than Farm & Foods[7] | 119.8 | 119.8 | 115.4 |

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100



...new Cincinnati Finishing System at NuTone

This automatic painting and baking system, designed by CINCINNATI for NuTone, Inc., world-famous manufacturer of door chimes, ventilating fans and kitchen hoods, has increased production, sharply slashed finishing costs and doubled capacity per square foot area. Paint consumption is reduced to from 35 to 50% of what was formerly required.

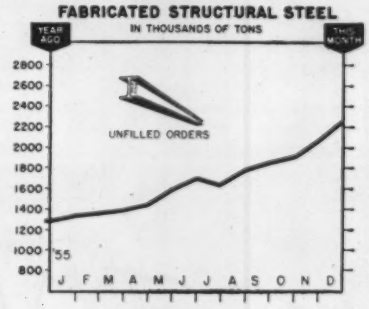
Add to this a substantial increase in production, and you realize the higher efficiency NuTone has achieved, while saving more than $900 per week!

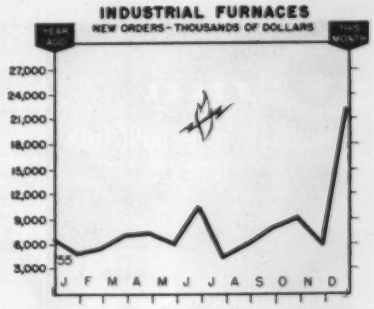
Let a CINCINNATI Cleaning and Finishing engineer take a look at your finishing costs. He'll give you a no-obligation analysis that can point to real savings for you.

Write today!

Cincinnati

THE CINCINNATI CLEANING AND FINISHING MACHINERY COMPANY




| | Shipments 1955 | Shipments 1954 | Backlogs 1955 | Backlogs 1954 |
|---|---|---|---|---|
| Jan. | 225.8 | 245.6 | 1,346 | 1,686 |
| Feb. | 213.4 | 253.1 | 1,360 | 1,697 |
| Mar. | 227.8 | 285.4 | 1,392 | 1,645 |
| Apr. | 239.7 | 293.5 | 1,444 | 1,566 |
| May | 223.2 | 253.9 | 1,592 | 1,490 |
| June | 282.3 | 290.3 | 1,706 | 1,391 |
| July | 219.4 | 265.2 | 1,639 | 1,429 |
| Aug. | 268.0 | 272.5 | 1,776 | 1,270 |
| Sept. | 289.1 | 265.4 | 1,854 | 1,329 |
| Oct. | 283.8 | 258.4 | 1,928 | 1,294 |
| Nov. | 258.9 | 228.7 | 2,075 | 1,280 |
| Dec. | 248.0 | 223.5 | 2,243 | 1,281 |
| Total | 2,979.4 | 3,135.5 | | |

American Institute of Steel Construction

| | 1955 | 1954 | 1953 |
|---|---|---|---|
| Jan. | 4,973 | 3,086 | 5,398 |
| Feb. | 5,616 | 3,086 | 6,009 |
| Mar. | 7,345 | 4,079 | 5,101 |
| Apr. | 7,639 | 3,496 | 5,140 |
| May | 6,205 | 5,848 | 4,698 |
| June | 10,616* | 5,663 | 4,910 |
| July | 4,338 | 1,664 | 6,334 |
| Aug. | 6,273 | 2,570 | 7,519 |
| Sept. | 8,351 | 2,534 | 4,442 |
| Oct. | 9,568 | 3,837 | 3,486 |
| Nov. | 6,180 | 3,188 | 3,430 |
| Dec. | 22,548* | 6,847 | 3,081 |

*June includes $4,804,418 in steel mill furnace orders for first half. December includes $11,443,071 in steel mill furnace orders for second half

Industrial Heating Equipment Assn. Inc.

Charts copyrighted, 1956, STEEL

best tally on the books. The institute predicts production for last week was 2,403,000 tons, or 97.6 per cent of capacity.

The steel market remains strong despite cutbacks in the auto industry. Some mills report reduction of from 10 to 20 per cent in April orders from automakers, but this will have little effect on operations. There still isn't enough steel to go around in the quantities desired.

## Autos Stage Small Comeback

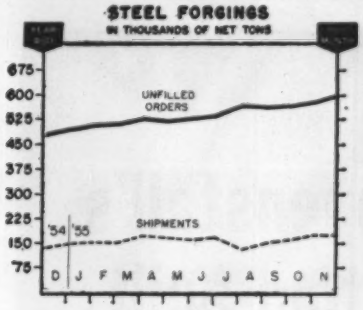
That leaves the auto industry as the blot on the record. But strange as it may seem, the industry staged a slight comeback in the week ended Feb. 4, states *Ward's Automotive Reports*. Preliminary figures bring the total U. S. and Canadian production of cars and trucks to 175,753 units compared with 169,263 units the previous week. This is still well below the level of the year-ago week (190,-140 units), but it comes on top of announcements by all producers of cutbacks and layoffs. Most serious report comes from Chrysler Corp., whose Detroit hourly workers reported only four days last week. Chrysler said the four-day week was only temporary, but in the face of rising dealer stocks, it could happen again.

Studebaker-Packard Corp. also is cutting back. The Packard Clipper Division is closed down and will not reopen until later this week.

Indications still are that this will be the second-best year in automotive history, however. Buick dealers sold 51,367 cars in January, just 2389 short of the record last year. And Roy C. Ingersoll, president of Borg-Warner Corp., predicts that 1956 will see between 6.5 million and 6.7 million units roll off the production lines. B-W's sales are expected to rise, he says, because of recent contracts from new automaker customers and better contracts from older customers.

Trucks will be the difference between a second-best year and an "also ran." *Ward's* points out that January production edged above the scheduled 106,000 units, and another 105,000 are planned for February. The two-month total of 211,000 would represent a 37-percent gain over the first two months of 1955. Strength in the "over 26,-000 lb gross" class is especially notable. John L. McCaffrey, president of International Harvester Co., big producer of these road giants, says: "We have a sub-

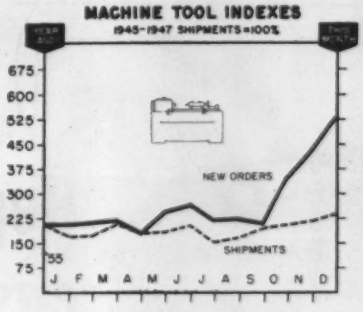
**STEEL FORGINGS**
IN THOUSANDS OF NET TONS




| | Shipments 1955 | Shipments 1954 | Unfilled Orders 1955 | Unfilled Orders 1954 |
|---|---|---|---|---|
| Jan. | 136 | 139 | 488 | 638 |
| Feb. | 135 | 127 | 492 | 539 |
| Mar. | 154 | 130 | 507 | 487 |
| Apr. | 150 | 116 | 499 | 460 |
| May | 147 | 107 | 509 | 431 |
| June | 155 | 113 | 520 | 409 |
| July | 115 | 97 | 552 | 395 |
| Aug. | 135 | 102 | 547 | 410 |
| Sept. | 149 | 109 | 552 | 409 |
| Oct. | 158 | 113 | 560 | 382 |
| Nov. | 158 | 120 | 585 | 461 |
| Dec. | ... | 129 | ... | 473 |

U. S. Bureau of the Census. Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more

**MACHINE TOOL INDEXES**
1945-1947 SHIPMENTS=100%




| | New Orders 1955 | New Orders 1954 | Shipments 1955 | Shipments 1954 |
|---|---|---|---|---|
| Jan. | 203.0 | 173.5 | 167.3 | 319.4 |
| Feb. | 209.4 | 159.8 | 168.2 | 323.1 |
| Mar. | 214.6 | 169.6 | 202.5 | 327.2 |
| Apr. | 178.1 | 142.8 | 180.1 | 302.7 |
| May | 243.7 | 139.5 | 180.9 | 270.3 |
| June | 263.2 | 185.2 | 198.8 | 276.3 |
| July | 217.8 | 124.7 | 152.9 | 205.7 |
| Aug. | 221.3 | 147.9 | 164.6 | 203.7 |
| Sept. | 207.3 | 180.9 | 195.4 | 213.4 |
| Oct. | 347.1 | 148.9 | 204.2 | 191.0 |
| Nov. | 433.3 | 119.5 | 214.2 | 179.5 |
| Dec. | 530.8* | 202.9 | 237.1* | 203.4 |

*Preliminary
National Machine Tool Builders' Assn.

stantial backlog of orders on hand. Improvements in design and mechanical features and others to come in 1956 give us a strong position for the year."

## Construction May Be the Key

Construction could be the key to business conditions in 1956 as it was in 1954. *Engineering News-Record* reports that heavy engineering construction contracts at the rate of $398 million per week set a record for the month of January. And February launched out to beat that, with contracts worth $532.9 million recorded in the week ended Feb. 2. That's 90 per cent ahead of the corresponding 1955 week. Cumulative five-week totals are: $2,125,810,000 for 1956 and $1,592,837,000 for 1955. It looks like structurals will remain tight.

## "No Reason for Pessimism"

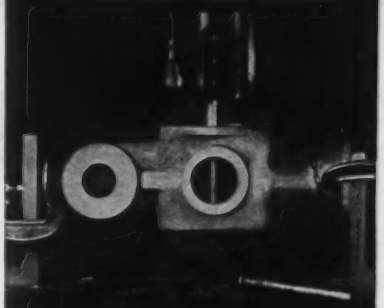
All of this leads to one conclusion, according to the Chamber of Commerce of the United States: "There is little reason for pessimism about business prospects in 1956, even though net gains in the economy will be below those of 1955."

The chamber points out that businessmen expect to spend 13 per cent more on new plants and equipment this year than last. More than half of those responding to a private survey also expect to spend more in 1957 than they will this year. In addition, the Labor and Commerce departments expect a 5-per-cent increase in construction. If the predictions come true, the chamber says, it will result in fairly stable prices. Also, there is a possibility of a tax cut and expanded highway and school construction programs to help out. But the chamber adds: "Aggressive selling and marketing and new product development will be needed to keep the economy on a stable, expanding basis."

## Appliances Ride the Swell

Appliances entered 1956 with strong ground swell. The Vacuum Cleaner Manufacturers' Association reports sales of 3,268,875 units in 1955, highest since 1950. And Radio-Electronics-Television Manufacturers Association says production of television receivers set a new record in 1955 at 7,756,521 units. Radio output at 14,894,695 units was the highest since 1948. The increase from 1954 was over 4.5 million units.


33% DECREASE IN DIE WEAR ON THIS GRAY IRON FITTING



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# Heppenstall's custom-built back-up roll sleeves...

## work to your over-all cost advantage

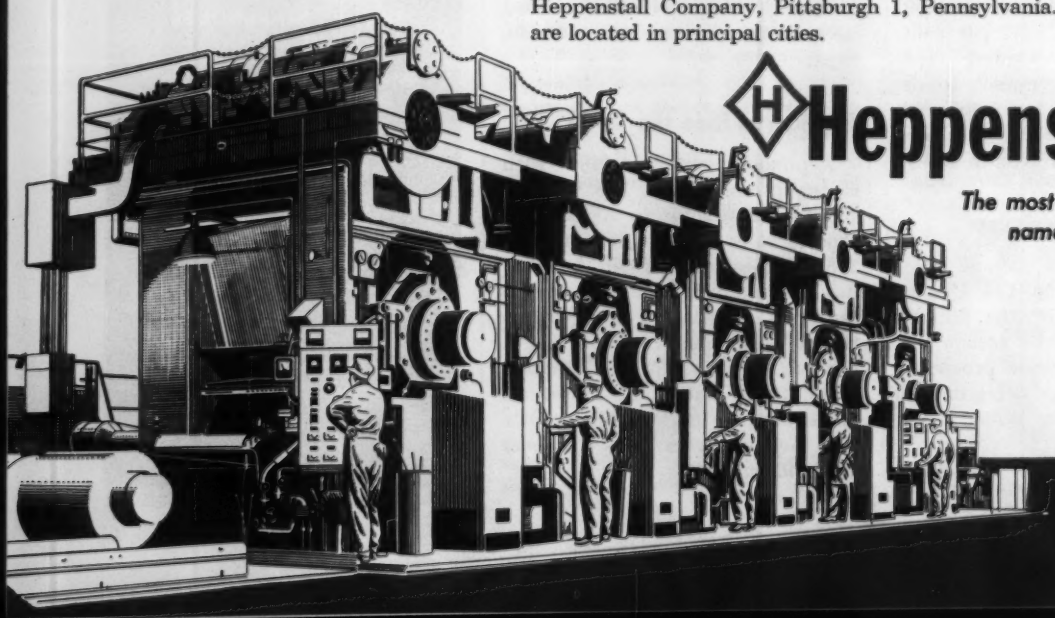
Heppenstall Back-Up Roll Sleeves enable you to roll record tonnages . . . decrease downtime . . . and effect over-all cost reduction. They give longer working life in today's high-speed mills because their up-to-the-minute design permits utilization of more effective forging and heat treating operations in their production. Each sleeve's working surface is *tempered to meet your exact hardness specification.*

These mandrel-forged sleeves—made from highest quality Heppenstall-produced alloy steel—are worked thoroughly under modern hydraulic presses to produce a finished product having both maximum density and grain refinement. In addition, they offer you exactness of fit and greater resistance to cracking and spalling during high-speed rolling.

All Heppenstall sleeves are fitted to extremely close tolerances which prevent circumferential slippage. Longitudinal movement is also eliminated because they are further locked in place by both a shoulder and Heppenstall's own patented locking ring.

Heppenstall also produces forged arbors . . . has facilities to grind both arbors and sleeves for perfect shrink-fitting.

For additional information and technical assistance, contact Heppenstall Company, Pittsburgh 1, Pennsylvania. Sales offices are located in principal cities.



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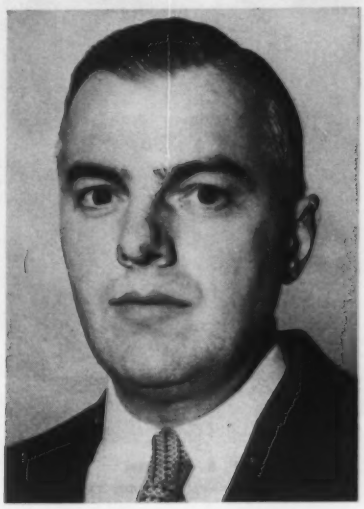
. . . executive v. p. at Sheffield Corp.

JOHN L. COTSWORTH
. . . Northeastern Steel sales manager



HENRY HALLER JR.
. . . National Valve & Mfg. president

**Paul W. Polk** was elected executive vice president, **Sheffield Corp.**, Dayton, O. He succeeds **John P. Bernard**, who resigned and has joined Toledo Scale Co., Toledo, O. Mr. Polk has been president of Threadwell Tap & Die Co., a subsidiary of Sheffield at Greenfield, Mass.

**Dan T. Bradley** was named to the new post of vice president in charge of engineering and sales of **Harris Products Co.**, Cleveland. He was engineering vice president.

**Alexander Carnie** was named chief division engineer, **Truscon Steel Division**, Republic Steel Corp., at Youngstown. Former chief division engineer, Union Drawn Steel Division in Massillon, O., he succeeds **Ray C. Skeel**, retired.

**J. Milton Shatzel** was made director of manufacturing, **United Steel & Wire Co.**, Battle Creek, Mich. **Louis C. White** was made assistant to the president and director of industrial relations.

**Lester B. Hibner** was made purchasing agent for **A. B. Farquhar Division**, York, Pa., Oliver Corp. He succeeds **John S. Throne**, now defense products manager for the division.

**Onsrud Machine Works Inc.**, Chicago, appointed **Robert M. Miller** sales manager, woodworking machinery and portable tool divisions.

**John L. Cotsworth** was made sales manager, **Northeastern Steel Corp.**, Bridgeport, Conn. In addition to products of the firm's steel strip plant, he will direct marketing of specialty steels soon to be produced at facilities now under construction.

**Spencer H. Mieras** was elected president and general manager, **Warner Automotive Parts Division**, Borg-Warner Corp., at Auburn, Ind. He was executive vice president of Miller Mfg. Co. and general manager of its subsidiary, Bonney Forge & Tool Works.

**Desmond S. Chambers** was made plant metallurgist at **Vanadium-Alloys Steel Co's** speed steel mill in Latrobe, Pa. He replaces **Charles F. Sawyer**, now works manager.

**C. D. King** was made assistant to executive vice president-operations of **United States Steel Corp.**, Pittsburgh. He was general chairman of the corporation's operating committees which have been reorganized, with a separate chairman for each major process: **J. J. Golden** was made chairman, steel production; **Alex Montgomery Jr.**, chairman for rolling; and **J. M. Stapleton**, chairman for iron production. In addition, Messrs. Golden, Montgomery and Stapleton continue as assistants to vice president-steel operations.

**Henry Haller Jr.** was elected president of **National Valve & Mfg. Co.**, Pittsburgh. He succeeds his father, **Henry E. Haller Sr.**, now chairman. **Frederick W. Richmond** was named chairman of the executive committee. **George B. Anderson Jr.**, in charge of sales at New York, was elected a vice president.

**David M. Kasson** resigned as president of Kasson Die & Motor Corp. to join **Brennen, Bucci & Weber**, New York, as president and general manager.

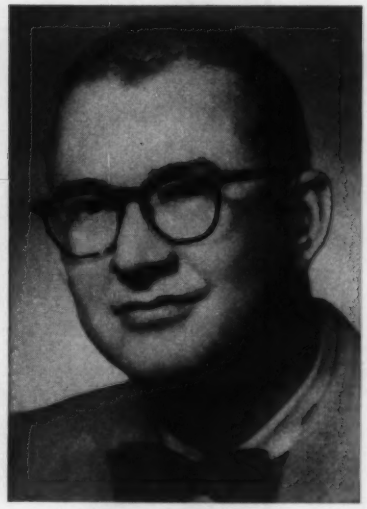
**Edwin J. Merrell** was made chief engineer, **Habirshaw Cable & Wire Division**, Phelps Dodge Copper Products Corp., Yonkers, N. Y., to succeed **W. A. Del Mar**, now consultant engineer for the company.

**L. W. Darling** was elected assistant vice president of **Davey Compressor Co.**, Kent, O.

**John E. Duesing** was made sales manager, mechanical division, **Hagan Corp.**, Pittsburgh. He replaces the late **Gerald G. Lipke**. Mr. Duesing recently was named general manager of Dominion Flow Meter Co. Ltd., subsidiary.

**D. W. Sherman** was made executive staff engineer for **A. O. Smith Corp.**, Milwaukee. He is concerned with the quality level of product, tooling, equipment and processing methods. **James F. Jones** was

**R. B. WARREN**
*. . . Goodyear's industrial products sales mgr.*



**ROBERT C. McDOWELL**
*. . . heads Wellman Engineering Co.*

**FRED E. SOLYMOS**
*. . . Colonial Metals v. p.-gen. sales mgr.*

made automotive products group assistant manager.

**R. B. Warren** was named sales manager, industrial products division, **Goodyear Tire & Rubber Co.**, Akron, effective June 1. He will succeed **H. D. Foster** who will retire. Mr. Warren is succeeded as manager, industrial products department, by **O. A. Schilling**, effective Feb. 20. Mr. Warren will attend the Advanced Management Training program at Harvard University's School of Business.

**Gleason Works**, Rochester, N. Y., appointed **George Hessler** works manager; **Herbert G. Hartman**, chief mechanical consultant; and **Charles B. King**, associate chief research engineer.

**John J. Wilber** succeeds **C. C. McClelland** as Cleveland district sales manager, **Bailey Meter Co.**

**H. Edward Ehlers Jr.** and **Warren A. Zimmer** were elected vice presidents of **Joseph Dixon Crucible Co.**, Jersey City, N. J. Mr. Ehlers was general sales manager and Mr. Zimmer works manager.

**Dale Orr** was made Pittsburgh district manager, **Steel Plant Equipment Corp.** He replaces **Robert Terrick.**

**F. V. Horak** was named metallurgical operations manager and **W. J. Cherones** electrical engineering manager at **Harnischfeger Corp.**, Milwaukee.

**Robert C. McDowell**, chairman of **Wellman Engineering Co.**, Cleveland, will also serve as president to succeed **Dr. J. C. Hodge**, resigned. Mr. McDowell is also president of McDowell Co. Inc.

**Henry C. Goodrich** was elected vice president of **Rust Engineering Co.**, Pittsburgh.

**John P. Bernard** will join **Toledo Scale Co.**, Toledo, O., effective Mar. 19, as executive vice president and a director. He has been with Sheffield Corp. as executive vice president.

**Columbia Tool Steel Co.** appointed **Jess N. McCombe** as Milwaukee district sales manager.

**H. E. Heywood Jr.**, plant manager of **National Supply Co.** at Gainesville, Tex., was promoted to works manager.

**John R. Clark Jr.** joined the sales organization of the chemicals division of **Houdry Process Corp.**, Philadelphia. He was plant manager, Washington Brick Co.

**Gordon H. Chambers** was named chairman and **L. G. Bliss** president of **Foote Mineral Co.**, Philadelphia.

**Bakelite Co.**, New York, a division of Union Carbide & Carbon Corp., appointed **John D. Benedito** general sales manager. He succeeds **H. K. Intemann**, now executive vice president of **Electro Metallurgical Co.**, also a division.

**Fred E. Solymos** was elected vice president and general sales manager of **Colonial Metals Co.**, Columbia, Pa.

**John J. Craig**, authority on the beneficiation of iron ores, has been retained as iron ore and steel consultant for the iron ore interests of **Cyrus Eaton**, Cleveland industrialist. Mr. Eaton is chairman of Chesapeake & Ohio Railway and Steep Rock Iron Mines Ltd. Mr. Craig has been with Arthur G. McKee & Co. for the last ten years.

**Gordon Lamont** was named chairman of the board of **Beryllium Corp.**, Reading, Pa.

**Solar Steel Corp.** appointed **Samuel W. Solomon** vice president-sales, Hanover Division, Union, N. J.

**Richard M. Somers** was made director of engineering, Kansas City, Mo., division, **Bendix Aviation Corp.**

**Samuel Wessel**, assistant vice president, was elected a vice president of **Hyman-Michaels Co.**, Chicago.

**Guy H. Pitts** was named manager of the fabrication division of **Bohn Aluminum & Brass Corp.**, Detroit. He will oversee manufacturing operations in Michigan and Indiana plants.

**T. R. Dunlevy** was made general sales manager, Southco Division, **South Chester Corp.**, Lester, Pa. **H. J. Jordan** was made manager

# Never leave dependability out of your fuel picture

A sailboat has no choice—it must depend upon an undependable wind for locomotion. Fortunately, you have a choice in fuels for your firing system. Select the fuel known for *complete* dependability—Bituminous coal! It's the one fuel which gives you:

***Dependability of Supply***—Bituminous coal provides, for centuries to come, an inexhaustible source of low-cost heat and energy. The vast Bituminous fields served by the B&O contain a great variety of outstanding coals for every purpose.

***Dependability of Cost***—Cost is kept low and stable thanks to the advancements made by modern mechanized mining. And coal is economical and safe to store.

***Call on our Coal Technical Service!*** You will receive authoritative information on how to select the right Bituminous coal for your specific firing job . . . how to make the most of your fuel dollar. *Ask our man!*

Write: COAL TRAFFIC DEPARTMENT
BALTIMORE & OHIO RAILROAD
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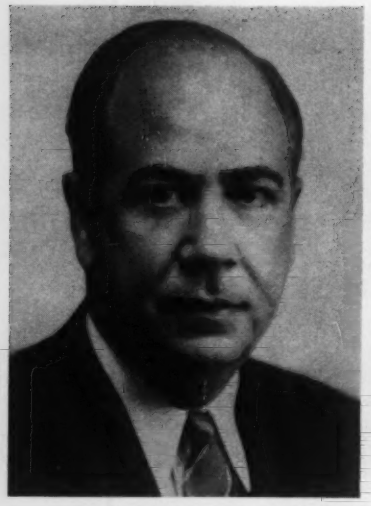
***BITUMINOUS COALS FOR EVERY PURPOSE***

**BALTIMORE & OHIO RAILROAD**
Constantly *doing things*—better!

LINKING 13 GREAT STATES WITH THE NATION
B&O



**MYRON B. DIGGIN**
*. . . Hanson-Van Winkle-Munning v. p.*

**GEORGE PERRAULT JR.**
*. . . E. W. Bliss Co. vice president*

**JAMES W. WILCOCK**
*. . . gen. sales mgr., Sturtevant Div.*

of fastener sales and **W. E. Stowe** manager of rivet sales.

**Myron B. Diggin** was elected vice president and director of **Hanson-Van Winkle-Munning Co.**, Matawan, N. J. He served as technical director the last nine years, and was made an assistant vice president in 1954.

**George Zimmerman** was elected vice president-sales, **General Steel Warehouse Co. Inc.**, Chicago. **E. B. Braun** was named sales manager, steel warehouse.

**David G. Matthews** was promoted to assistant sales manager by **Wilton Tool Mfg. Co. Inc.**, Schiller Park, Ill. He replaces **William Ferrick**, now sales manager.

**George R. Morin** joined **Split Ballbearing Corp.**, Lebanon, N. H., as superintendent. He was production manager of the Frankford plant of SKF in Philadelphia.

**George Perrault Jr.**, manager of the Salem, O., rolling mill division of **E. W. Bliss Co.**, was appointed a vice president of the company.

**Philip Finale** was made chief engineer, rolling mill division, **Engineering Supervision Co.**, subsidiary of Birdsboro Steel Foundry & Machine Co., at New York.

**David W. Bonnar** was made assistant sales manager, **Clearing Machine Corp.**, Hamilton, O., division of U. S. Industries Inc.

**L. Randall Thomas** was made assistant plant manager of U. S. Steel Corp.'s **American Bridge Division** at Gary, Ind.

**Superior Steel Corp.** appointed **James B. Fisher** Detroit district sales manager to succeed **Lee D. Walters.** Mr. Walters was made assistant vice president and special automotive representative in the Detroit territory.

**James W. Wilcock** was made general sales manager of the Sturtevant Division of **Westinghouse Electric Corp.** at Hyde Park, Mass. He was general manager of sales at Oliver Iron & Steel Corp.'s Berry Division, Pittsburgh. **M. F. Glaser** was made manager of Westinghouse Corp.'s Youngstown branch, succeeding **J. T. Peden**, who retires Feb. 29.

**Perry W. Linscott** was made manager of marketing for **Edgcomb Steel of New England Inc.**, Nashua, N. H.

**Ludrick Kukulinski** was made superintendent of the mechanical department of **Republic Steel Corp.'s** Youngstown district steel plant.

**Milton W. Phair** was made sales manager, Houston district, U. S. Steel Corp.'s **Tennessee Coal & Iron Division. James R. Davis** was made assistant sales manager.

## *OBITUARIES . . .*

**H. A. Flannery**, 61, manager of engineering, **Goodyear Tire & Rubber Co.**, Akron, died Jan. 28.

**H. M. Allison**, 58, chief engineer, **John Bath & Co. Inc.**, Worcester, Mass., died Jan. 27.

**Elmer O. Bischoff**, assistant secretary and treasurer, **Grede Foundries Inc.**, Milwaukee, died Jan. 27.

**Irving Fritz**, 60, president, **Fritz Steel Corp.**, Bronx, N. Y., died Jan. 30.

**Harvey Hewitt Sr.**, 67, former vice president in charge of West Coast sales for **Bethlehem Pacific Coast Steel Corp.**, died Jan. 28 in Pasadena, Calif.

**Edward C. Pike**, 53, director of purchases for **True Temper Corp.**, Cleveland, died Jan. 1.

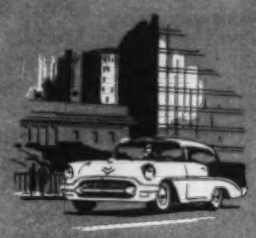
**David R. Clements**, 58, sales manager, **Ohio Blow Pipe Co.**, Cleveland, died Jan. 31.

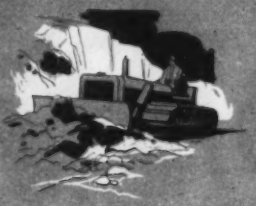
**Edward Norris**, 78, former president-chairman of **Utica Drop Forge & Tool Corp.**, Utica, N. Y., died Jan. 24.

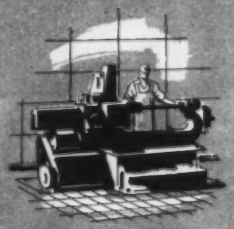
**John H. S. Spencer**, 60, vice president and secretary, **H. W. Butterworth & Sons Co.**, Bethayres, Pa., died Jan. 26.

# A complete line of Roller Bearings . . .

*For every field of transportation and industry*





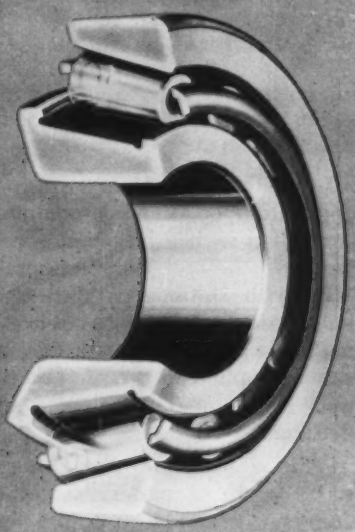


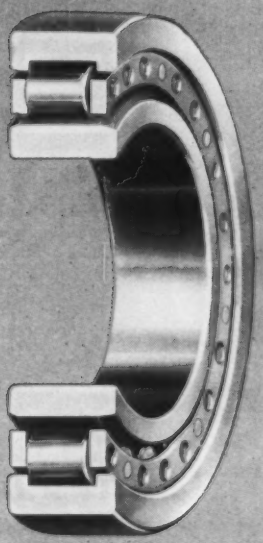
## Job-tailored in a wide range of sizes to fit your specific needs

Aircraft? Automobiles? Earth-moving or farm equipment? *Whatever* you make, if your product uses straight or tapered roller bearings, Bower can meet your specifications *exactly*. For dependable Bower bearings are virtually custom-built to the job . . . engineered and sized to match any requirement.

Important, too, are exclusive Bower design features that assure long life, top performance, *less maintenance*. And when you specify Bower bearings you can always be certain of the highest quality materials and workmanship. These reasons, of course, are why Bower straight, tapered and journal roller bearings are used by leading manufacturers everywhere—for any application.

Let a Bower engineer give you full details of the complete Bower line. Call him in while your product is still in the design stage.





BOWER ROLLER BEARINGS

*BOWER ROLLER BEARING DIVISION* • *FEDERAL-MOGUL-BOWER BEARINGS, INC., DETROIT 14, MICH.*

# Spray-applied lubricants cut metal-drawing costs!

**DeVilbiss Spray Method:**

- **Saves up to 75% in drawing compounds**
- **Reduces press clean-up**
- **Promotes longer die life**
- **Produces better stampings and drawn parts**

Now, with the DeVilbiss spray method, the application of drawing compounds can be controlled with a higher degree of accuracy than ever before! Whether sprayed by hand — or with stationary guns, operated semi-automatically by remote control or fully automatically with synchronous action—the lubricant is applied to the die exactly where it is most vital, and in the specific amounts necessary.

This *controlled-application* method eliminates waste of materials and the need for frequent press clean-up to remove excess compound, and there's no danger of "hit or miss" lubrication, which frequently leads to torn or defective work. What's more, the "closed system" operation of the DeVilbiss spray method prevents foreign particles from mixing with materials, and causing costly damage to dies. In addition, operator fatigue is reduced considerably over brush and roller methods.

Cut your stamping costs now! Save time, labor, and materials with the DeVilbiss spray method. Contact your nearest DeVilbiss representative today.

***Split-second timing.*** **As die opens and closes, DeVilbiss automatic guns spray exact amounts of drawing compound evenly over specific areas of die. To synchronize spray with press cycle, cam-actuated air valve is worked off the ram. In other instances, a solenoid air valve is actuated by chain-drive timer, operating off gear wheel.**

**THE DEVILBISS COMPANY**
**Toledo 1, Ohio**

*Santa Clara, Calif.* • *Barrie, Ontario* • *London, England*

*BRANCH OFFICES IN PRINCIPAL CITIES*

FOR BETTER SERVICE, BUY
**DEVILBISS**

# Kaiser Starts $3-Million Project

## New facilities will boost capacity for producing periclase and magnesia products at Moss Landing plant and basic refractories at plant being constructed at Columbiana, O.

TO MEET steadily increasing demand for magnesia and basic refractories, Kaiser Aluminum & Chemical Corp.'s Kaiser Chemicals Division is expanding.

Its $3-million program will include addition of facilities to the Moss Landing, Calif., seawater magnesia plant and to the basic refractories plant under construction at Columbiana, O.

**Periclase**—New equipment for the Moss Landing plant will double its seawater handling capacity and will increase by more than 50 per cent its capacity to produce periclase. This product is used in basic refractories for high-temperature furnaces in the steel, copper, cement and glass industries.

A large rotary kiln will be installed at the seawater plant. It will have a capacity of about 150 tons of magnesia products per day, bringing daily kiln capacity to about 375 tons. Officials point out that this expansion is a further step toward eliminating the nation's dependence upon foreign supplies of magnesia.

New equipment at Columbiana will include additional pressing and materials handling facilities, which will increase the plant's capacity by 50 per cent. The plant is scheduled to be in operation by June 1. Additional facilities will be installed by Jan. 1, 1957. This project will double the division's capacity to produce basic brick and ramming mixes.

### Plans Reorganization

Henry J. Kaiser's industrial empire will be reorganized, subject to stockholders' approval. Henry J. Kaiser Co., the parent company, now owns 37 per cent of Kaiser Motors Corp., 100 per cent of the preferred stock of Willys Motors Inc. and varying percentages of other subsidiaries. Kaiser Motors Corp. owns 100 per cent of the common stock of Willys Motors and 31 per cent of Industrias Kaiser Argentina.

**New Name**—Under the proposed plan, Kaiser Motors Corp. will change its name to Kaiser Industries Corp. and will own 100 per cent of Henry J. Kaiser Co. and Willys Motors Inc. and 31 per cent of Industrias Kaiser Argentina. Henry J. Kaiser Co.'s percentage of ownership in its main operating divisions is not changed by the plan. It is, in percentages: Kaiser Metal Products Inc., 80; Kaiser Steel Corp., 80; Kaiser Community Homes, 50; Kaiser Aluminum & Chemical Corp., 37; Kaiser Services, 31; Permanente Cement Co., 30; Kaiser Center, 25.

Adoption of the plan, officials say, will save Kaiser Motors stockholders from serious financial losses and will give them a chance to share in earnings of some of the other Kaiser enterprises. Outstanding indebtedness of Kaiser Motors, including $13.3 million to the Reconstruction Finance Corp., would be repaid. This is the final debt owed by the Kaiser organization to RFC.

Kaiser Motors Corp. has "entirely discontinued the production of passenger cars." Its only stake in the auto industry will be the production of Jeeps and utility vehicles by its subsidiary, Willys Motors Inc.

### Schwarzkopf Reorganizes

Schwarzkopf Development Corp. has been organized by Dr. Paul Schwarzkopf to engage in all fields of powder metallurgy. The firm succeeds American Electro Metal Corp. with headquarters at 320 Yonkers Ave., Yonkers, N. Y.

Dr. Schwarzkopf also announces the establishment of Mallory-Schwarzkopf-Metals Inc., which is jointly owned by P. R. Mallory & Co. and Schwarzkopf Development Corp. This new company will produce molybdenum and other high-melting metals in a plant being constructed in Huntsville, Ala.

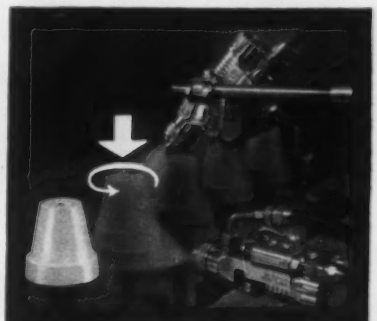
(*Please turn to page* 72)


# Cut Painting Costs ...with DeVilbiss automatic spray!

Just load your product or part on a high-speed DeVilbiss spray machine, and *phffft* . . . it's painted *automatically* at less cost to you! Split-second timing, accurate gun positioning, and synchronized conveyor speeds prevent streaks, sags, and wasteful overspray. You actually *save* materials, as you produce consistently better, more uniform finishes in a fraction of the time consumed by manual methods. It is the only automatic method capable of spraying inside deep cavities, as well as uniformly coating exterior surfaces.

**Know in advance the savings of automatic painting**

DeVilbiss offers automatic spray machines for painting products of practically any size or shape, and for use with most conveyor systems. To have us run a test on your product, and report projected savings, call your nearest DeVilbiss representative who will gladly arrange a test in our research lab.



*DeVilbiss automatic spray machine finishes 3¼" O.D. flower pots, up to 3600 an hour.*

THE DEVILBISS COMPANY

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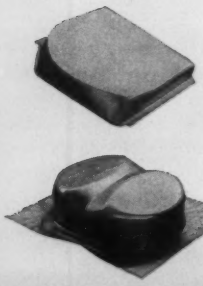
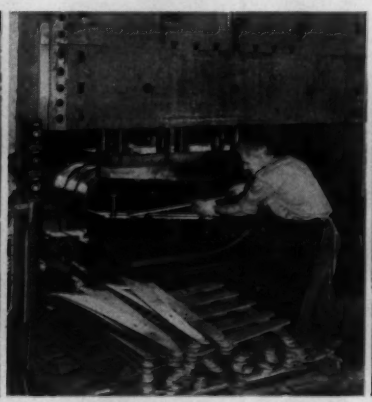
# For Deep Drawn Parts ... H-P-M

## *H-P-M Hydraulics Prove Their Versatility At Massey-Harris-Ferguson, Inc.*



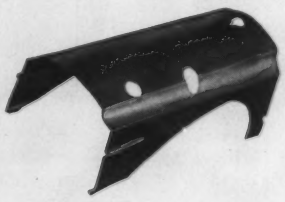
These three big H-P-M presses (the third just recently installed) are doing a "bang-up" job drawing deep, intricate parts for the famed Massey-Harris-Ferguson line of tractors and farm equipment. As a result the number of drawing operations has been greatly reduced, thus speeding up production . . . fewer dies, less press equipment, smaller factory space and less manpower have cut factory overhead. Due to their great versatility, these presses are used for all types of shallow and deep drawn parts and for short or long runs.

Two dies used simultaneously; at right, flange contour is trimmed while at left hole is punched in shallow end.

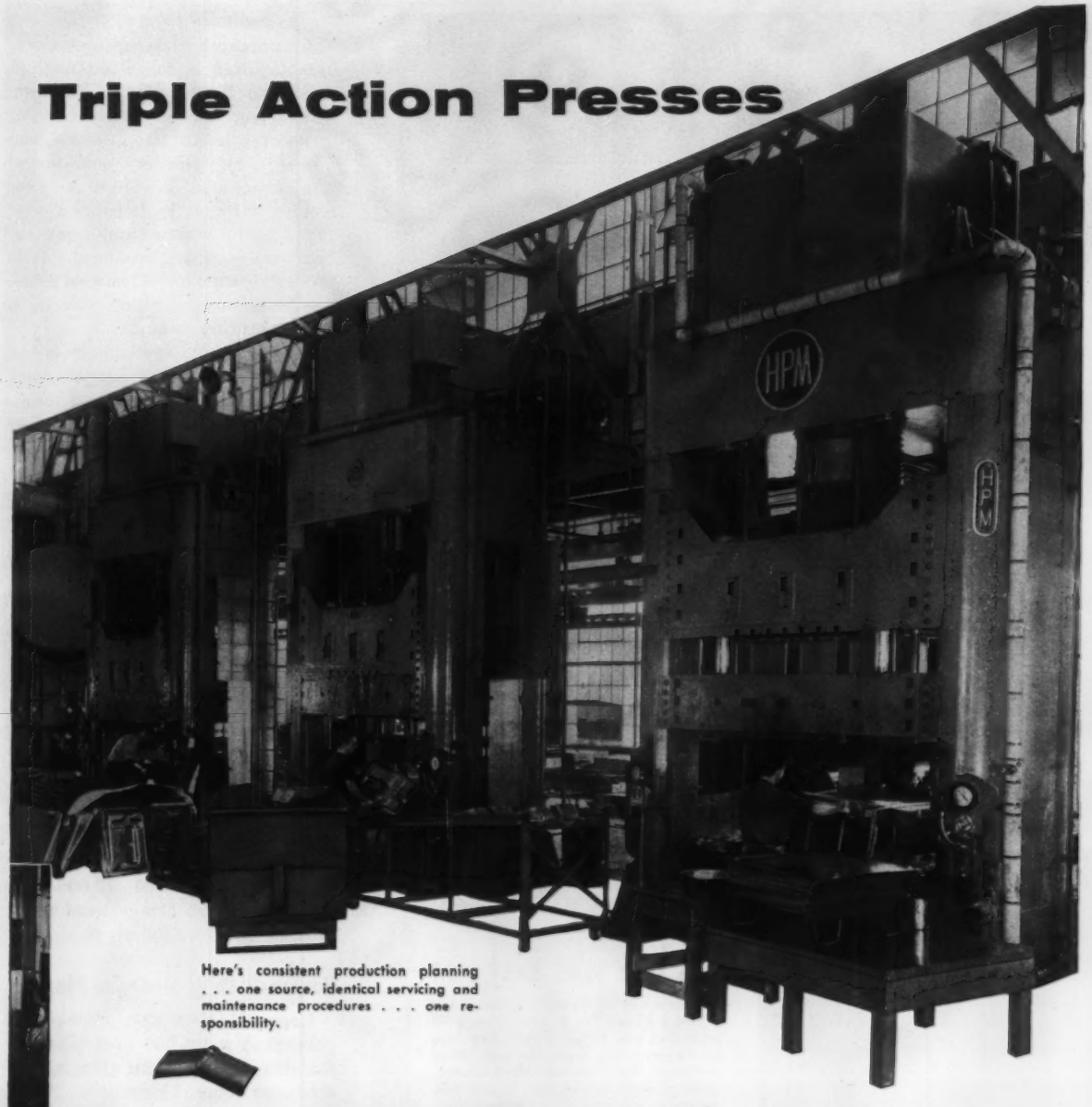


This die first forms fender brackets to desired shape and then forms flange into channel section—strong and rigid—in the same press stroke.

The fuel tank is drawn by this H-P-M. This 18 gauge part is sent to another trimming press by chute at left . . . one draw and the part is formed.



# Triple Action Presses




Here's consistent production planning . . . one source, identical servicing and maintenance procedures . . . one responsibility.

Here's why H-P-M presses really pay off . . .H-P-M's fastraverse closed circuit system provides constant and controllable drawing speed . . . smooth, fast action without impact . . . independent pressure adjustments of punch, blankholder and die cushion . . . positive blankholder pressure for entire length of draw . . . shockless reversal. With H-P-Ms, you have positive overload protection . . . there's no chance of breakage . . . press reverses at predetermined position or pressure. H-P-Ms also permit quicker die set up. You, too, can eliminate the guesswork . . . choose H-P-Ms for all your metalworking needs. Write today for complete information.

HPM

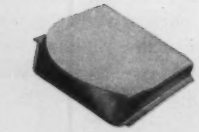
METAL WORKING DIVISION

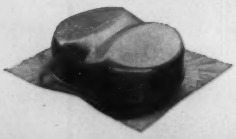
**THE HYDRAULIC PRESS MFG. CO.**

Mount Gilead, Ohio, U.S.A.

# For Deep Drawn Parts... H-P-M

## *H-P-M Hydraulics Prove Their Versatility At Massey-Harris-Ferguson, Inc.*





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Two dies used simultaneously; at right, flange contour is trimmed while at left hole is punched in shallow end.

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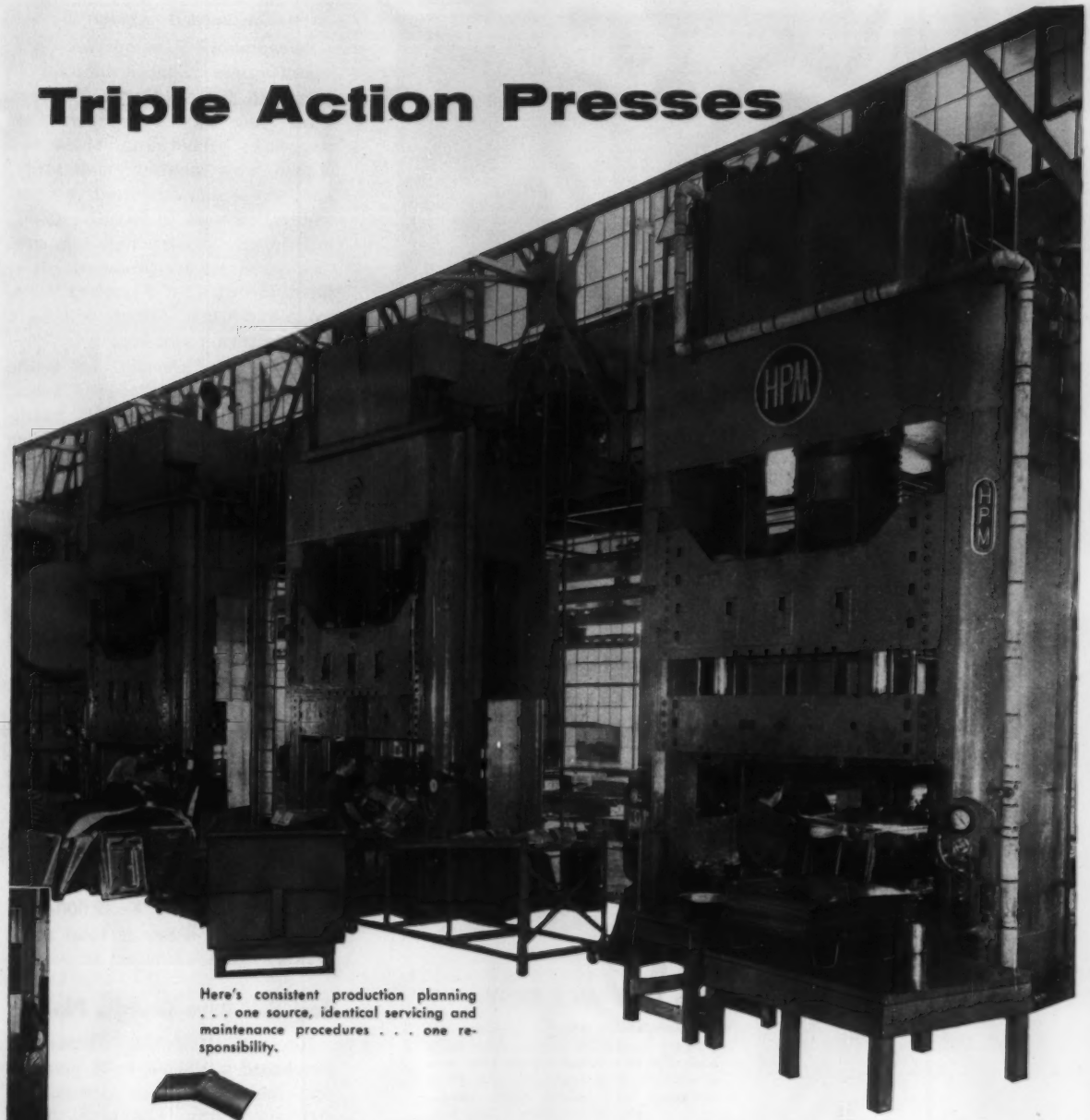
# Triple Action Presses




Here's consistent production planning . . . one source, identical servicing and maintenance procedures . . . one responsibility.

Here's why H-P-M presses really pay off . . .H-P-M's fastraverse closed circuit system provides constant and controllable drawing speed . . . smooth, fast action without impact . . . independent pressure adjustments of punch, blankholder and die cushion . . . positive blankholder pressure for entire length of draw . . . shockless reversal. With H-P-Ms, you have positive overload protection . . . there's no chance of breakage . . . press reverses at predetermined position or pressure. H-P-Ms also permit quicker die set up. You, too, can eliminate the guesswork . . . choose H-P-Ms for all your metalworking needs. Write today for complete information.

METAL WORKING DIVISION
THE HYDRAULIC PRESS MFG. CO.
Mount Gilead, Ohio, U.S.A.

HPM

**NILSON 4-SLIDE TAKES A TOUGH ONE . . .**

Mass production of body trim clips for a leading make automobile proved a complex forming problem. A. H. Nilson's 4-Slide (Model S-4-T) did the job, forming .025" x 3", 1065 C.R.A. steel at 54 strokes per minute! Accurate, fast, and automatic, Nilson 4-Slides keep pace with one of the nation's biggest industries.

**THIS ONE WAS EASY . . .**

A Nilson 4-Slide, Number 1, forms 150 drapery hooks per minute from 0.70 basic steel wire. Nilson 4-Slides form wire or ribbon stock from the coil. They straighten, feed, pierce, blank, swage, stamp or coin, cut and form in one, fast, automatic operation . . . accommodate wire up to .5" dia., in feeds to 32" max., and ribbon up to 3.5" wide. Press sections from 5 to 75 tons.

A. H. Nilson provides forming recommendations from detailed information without obligation. Send for catalog.

A.H. NILSON MACHINE COMPANY

1512 RAILROAD AVENUE, BRIDGEPORT 5, CONNECTICUT

Automatic Chain Making Machines : Staple Forming Machines : Wire Stock Reels

Wire Straightening Equipment : Slide Feeds for Presses : Wire & Ribbon Stock Forming Machines

(*Concluded from page 69*)

Schwarzkopf Development Corp. has acquired a large interest in American Sinteel Corp., Yonkers, which has started production of structural parts (iron, brass and bronze) by powder metallurgy. The firm also acquired a controlling interest in Borolite Corp., Pittsburgh, where high-temperature materials are produced. It is the sole owner of American Electro Metal Corp., which will be a manufacturing concern.

Schwarzkopf Development is the sole owner of Metallwerk Plansee, Tyrol, Austria, a powder metallurgy plant. Foreign interests also include Metro Cutanit Ltd., Warrington, England, chiefly maker of cemented carbides and electric contact materials. George Cohen Sinteel Ltd., London, which concentrates on research and manufacture of iron and steel parts based on powder metallurgy, is a partnership between that company and Schwarzkopf Development Corp.

## Stamping Firm Boosts Capacity

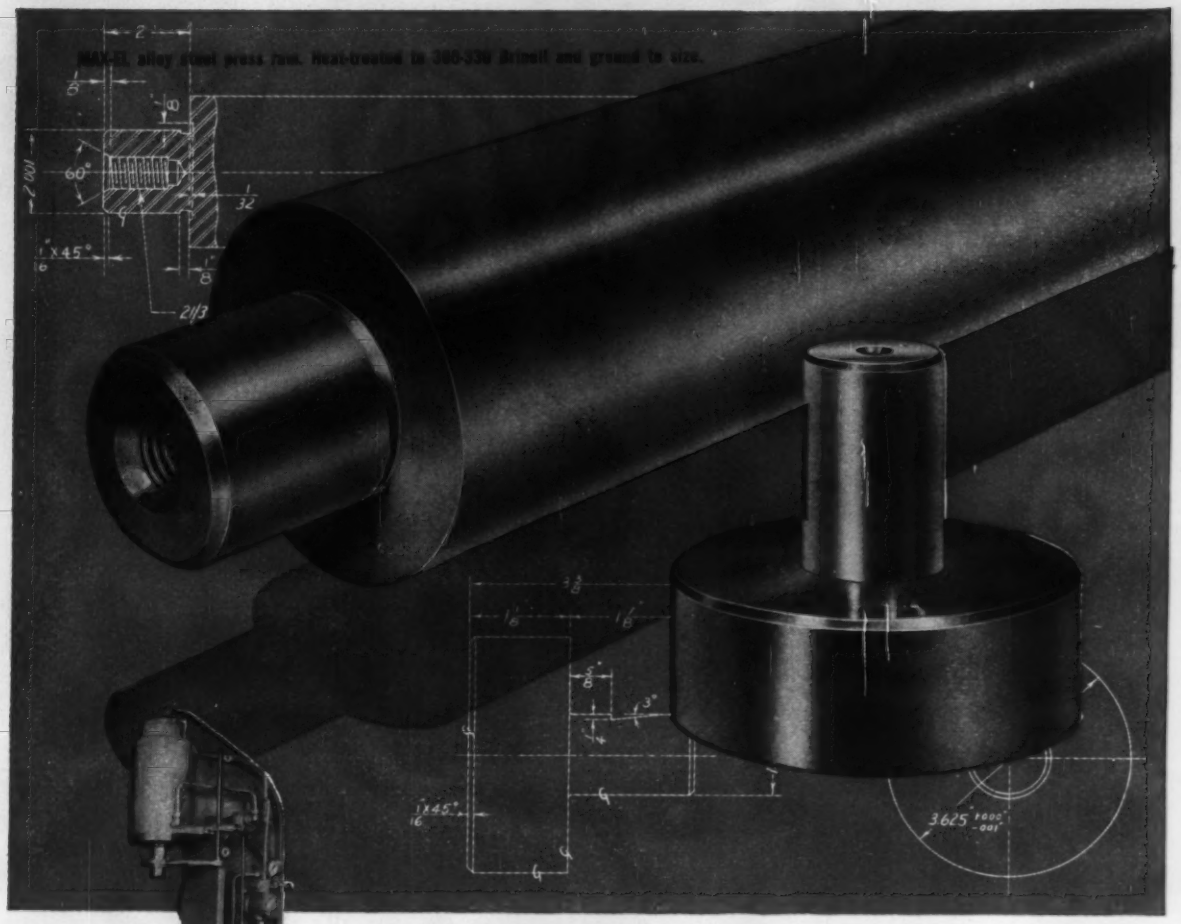
Volkert Stampings Inc., Queens Village 29, Long Island, N. Y., manufacturer of precision metal parts for the electronics industry, has increased production capacity by 25 per cent. A 12,000-sq-ft plant expansion brings total plant area to about 42,000 sq ft.

## Rockwell Buys Georgia Plant

Rockwell Mfg. Co., Pittsburgh, purchased a 106,000-sq-ft plant at Statesboro, Ga., from General Instrument Corp., Elizabeth, N. J. The plant will be used to make a variety of Rockwell meter, valve and other products.

## Central Boiler & Mfg. Renamed

Central Boiler & Mfg. Co., Detroit, changed its name to McGregor-Michigan Corp. The company has not made boilers in many years. Its diversified services as steel fabricators include construction of steel mill equipment, chemical and petroleum processing equipment, machine bases, diesel engine beds, heat exchangers, stacks and other plate fabrications. The firm also offers steel ware-




# MAX-EL Alloy Steel means no distortion—longer wear in 15-ton hydraulic press ram

To keep this 15-ton press operating day after day for years of dependable service, takes *special* steels. For example, even after thousands of cycles of operation, the ram *must* remain accurately in line with the work table. *It demands a steel that will not distort, set or wear.*

That's why both the ram and ram-plug are made of Crucible MAX-EL alloy steel. In fact, the manufacturer, Greenerd Arbor Press Co., Nashua, N. H., has been a steady user of MAX-EL for many years.

Here's what they have to say—*"We have tried many grades of steel, but we find that MAX-EL 3½ heat-treated in the bar works out better for our application."*

And it probably will for yours, too. So when you have a job calling for a non-deforming alloy steel—one with excellent machinability, high-strength and wear-resistance—try Crucible MAX-EL. It's promptly available from your nearby Crucible warehouse, in the sizes and grades you need. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

**Write for your free copy of this Crucible Publication Catalog listing dozens of helpful booklets and data sheets.**

**CRUCIBLE** first name in special purpose steels

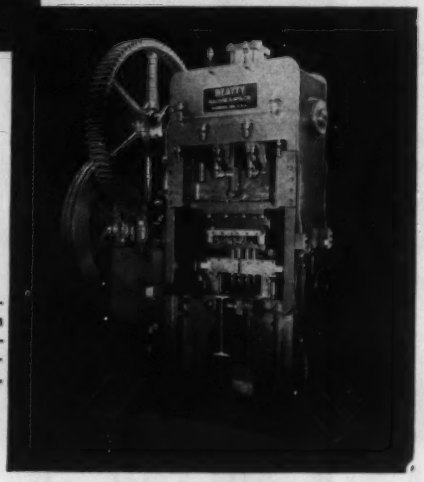
**Crucible Steel Company of America**

FASTER

WEB and FLANGE PUNCHING

*Beatty Built-in Adjustable Tools Save Set-up Time*

**GUILLOTINE BEAM WEB PUNCH**
Six individually controlled punching units with automatically synchronized punch and die, facilitate setting up to various gauge lines. 33" max. setting to outside units; 2⅜" min. setting between units. 200 ton cap.



**GUILLOTINE BEAM FLANGE PUNCH**
A turn of a handwheel changes punching centers and synchronizes punch with die. Four punching units, with 2¼" - 6¾" setting between inside and outside punches, adjustable 2¼" - 3½". 200 ton cap.

BEATTY Spacing Table handles web and flange punching without roll adjustment.

BEATTY Guillotine Beam Punch. Punches webs and flanges in "I" beams from 6 to 30 inches.

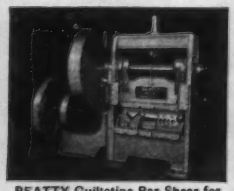
## REDUCE COSTS ON "SHORT-ORDER" PUNCHING

Take the high costs out of "short order" punching with these versatile BEATTY Guillotine Beam Punches. They're especially designed to reduce costs in handling short run web and flange punching where punching arrangements are frequently changed.

Incorporating entirely new time-saving *adjustable* tools that eliminate expensive setting up time, reduce down time . . . these BEATTY machines have lowered costs by as much as 75% on some metal fabricating jobs.

Dependable, accurate fast . . . BEATTY machines (standard models or custom-built to your specifications) can help solve your metal fabricating problems — reduce costs. Talk it over with a Beatty engineer!

BEATTY Gap Type Press for forming, bending, flanging, pressing. 250 ton cap.



BEATTY Guillotine Bar Shear for angles, bars, rounds squares without changing tools.

BEATTY
MACHINE & MFG. CO.
HAMMOND, IND.


housing service and power plant maintenance.

### Winsmith Buys Plant Facilities

Winsmith Inc., Springville, N. Y., maker of speed reducers, purchased Blaw-Knox Co.'s Foote Construction Equipment Division in Nunda, N. Y. The facilities consist of more than 78,000 sq ft and will more than triple Winsmith's present manufacturing space. The property will be operated as a subsidiary, Buffalo Assets Corp., with these officers: J. F. Murray, president; D. A. MacLeod, vice president; W. R. Emblidge, secretary.

### Forms Refractories Division

Corning Glass Works, Corning, N. Y., established a Refractories Division to consolidate the development, manufacture and sale of conventional refractories, special high-temperature refractories and Corning Glascast mold material for precision casting of metal alloys. E. C. Leibig is general manager of the division.

### Acme Consolidating Operations

Acme Steel Co. will build a $1.5-million building adjoining its executive office building in Riverdale, Ill., to house offices now at 2840 Archer Ave., Chicago. The project will be the final step in consolidating Acme's operations in Riverdale.

### Dow Corning Completes Project

Dow Corning Corp., Midland, Mich., completed the final unit in a $16-million plant expansion which more than doubles the firm's methyl siloxane capacity. This is reflected by a 7.5 per-cent reduction in its price of dimethyl silicone fluids and emulsions.

### Expands Canadian Operations

Metal & Thermit Corp., New York, and United Chromium of Canada Ltd., are combining Canadian activities under the name of Metal & Thermit-United Chromium of Canada Ltd. New office, warehouse and plant facilities will be built in Toronto to house the joint operation. Officers of the company

J&L
STEEL
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CARBON STEEL BARS
"J&L 1200"
Use "J & L 1200" steel on your tough jobs for . . .
tops in quality
tops in uniformity
tops in machinability
tops in finish
available in all standard shapes and sizes

# TORRINGTON *SPHERICAL ROLLER* BEARINGS

## This bearing can take thrust, too!

Design is the secret. TORRINGTON Spherical Roller Bearings are made with an integral center flange on the inner race. This assures *positive radial stability and accurate positioning of rollers* wherever high radial load and heavy thrust are encountered under conditions of misalignment.

From crushers to cranes, power shovels to pulverizers, you get long, maintenance-free operation, better performance in your equipment, more value from your bearing dollar when you specify these rugged dependable bearings.

Prove to yourself that TORRINGTON design does make a difference. Next time specify TORRINGTON Spherical Roller Bearings. They're available with either straight or tapered bore, for shaft or adapter mounting.

THE TORRINGTON COMPANY

South Bend 21, Ind. • Torrington, Conn.

*District offices and distributors in principal cities of United States and Canada*

90th ANNIVERSARY 1865–1955

**TORRINGTON BEARINGS**

**Spherical Roller • Tapered Roller • Cylindrical Roller Needle • Ball • Needle Rollers**

are: President, H. E. Martin; vice president and treasurer, C. J. Beasley; vice president, H. D. McLeese; secretary, J. F. Condon.

### Mexico To Get Sintering Plant

Altos Hornos de Mexico, S. A., Monclova, Mexico, awarded a contract to John E. Greenawalt, New York, for a sintering plant. Initial capacity will be 900 tons of sinter per day. This is the first iron ore sintering plant to be installed in Mexico.

## ASSOCIATIONS

Paul N. Collin, president of Allmetal Weatherstrip Co., Chicago, was elected president of the **Weatherstrip Research Institute,** Riverside, Ill. Other institute officers are: Elmer Barringer, Barland Weatherstrip Material Co., Cleveland, first vice president; Harry Zegers, Zegers Inc., Chicago, second vice president; C. F. Smith, National Guard Products Co., Memphis, Tenn., recording secretary; J. L. Dennis, W. J. Dennis & Co., Chicago, treasurer; and L. G. Klee, executive secretary.

C. D. Haxby was elected president of the **National Constructors Association,** New York. Mr. Haxby is vice president of Rust Engineering Co., Pittsburgh. C. B. Whyte, president of Procon Inc., Des Plaines, Ill., is vice president.

F. J. Dunleavy, Yale & Towne Mfg. Co., was elected president of the **Association of Lift Truck & Portable Elevator Manufacturers,** Pittsburgh. H. S. Germond III, Revolvator Co., is vice president and R. Kennedy Hanson, Hanson & Shea, secretary and treasurer.

Everett G. Fahlman, president of Permold Co., Medina, O., was reelected president of the **Aluminum Association,** New York. Other officers are: Chairman, Arthur V. Davis, chairman, Aluminum Co. of America; vice presidents, L. M. Brile, Fairmont Aluminum Co., Fairmont, W. Va.; F. B. Cuff, Aluminum Co. of America, New York; and G. N. Wright, Harsch Bronze & Aluminum Foundry, Cleveland.

- *Highest speed*
- *Simplest operation in its class*

**New, low-cost Streamliner 400**

Here is whiteprinting made easier than ever in the new low-cost Ozalid Streamliner 400. Compact, rugged, easy-to-operate . . . it delivers higher speed, greater volume, more "wanted" features than any other printmaker in its class.

Prints and develops at speeds up to 24 feet per minute . . . handles prints up to 42 inches wide. High-intensity mercury vapor lamp provides complete, uniform exposure. Patented evaporator and thermostatically controlled heater rod assure uniform print development.

Synchronized printing and developing sections permit continuous operation with roll stock. Short travel provides rapid processing of cut sheets. Automatic controls regulate temperature and ammonia flow. New electronic drive provides instantaneous speed changes with complete accuracy—simple enough for the novice operator!

Smartly styled, compact, the Streamliner 400 stands just 49″ high, 63″ wide, and 31″ deep, and is finished in durable, ripple-gray baked enamel. One-piece enclosed base, welded-steel body and tubular support assure exceptional rigidity and permanent alignment.

**INSTANT COLOR CHANGE**—You change print color instantly, simply by using different Ozalid papers. No messy fluid changes or time-consuming clean-up required on any Ozalid model.

Ask your nearest Ozalid distributor to demonstrate the low-cost, high-volume Streamliner 400. His number's in the phone book, or write Ozalid, Dept.P-2, Johnson City, N. Y., for descriptive brochure.

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DIRECT COPY SYSTEMS

*Got A Printmaking Problem?*
Call your local Ozalid representative. His expert advice is yours for the asking—whether or not you now own or plan to buy Ozalid equipment.

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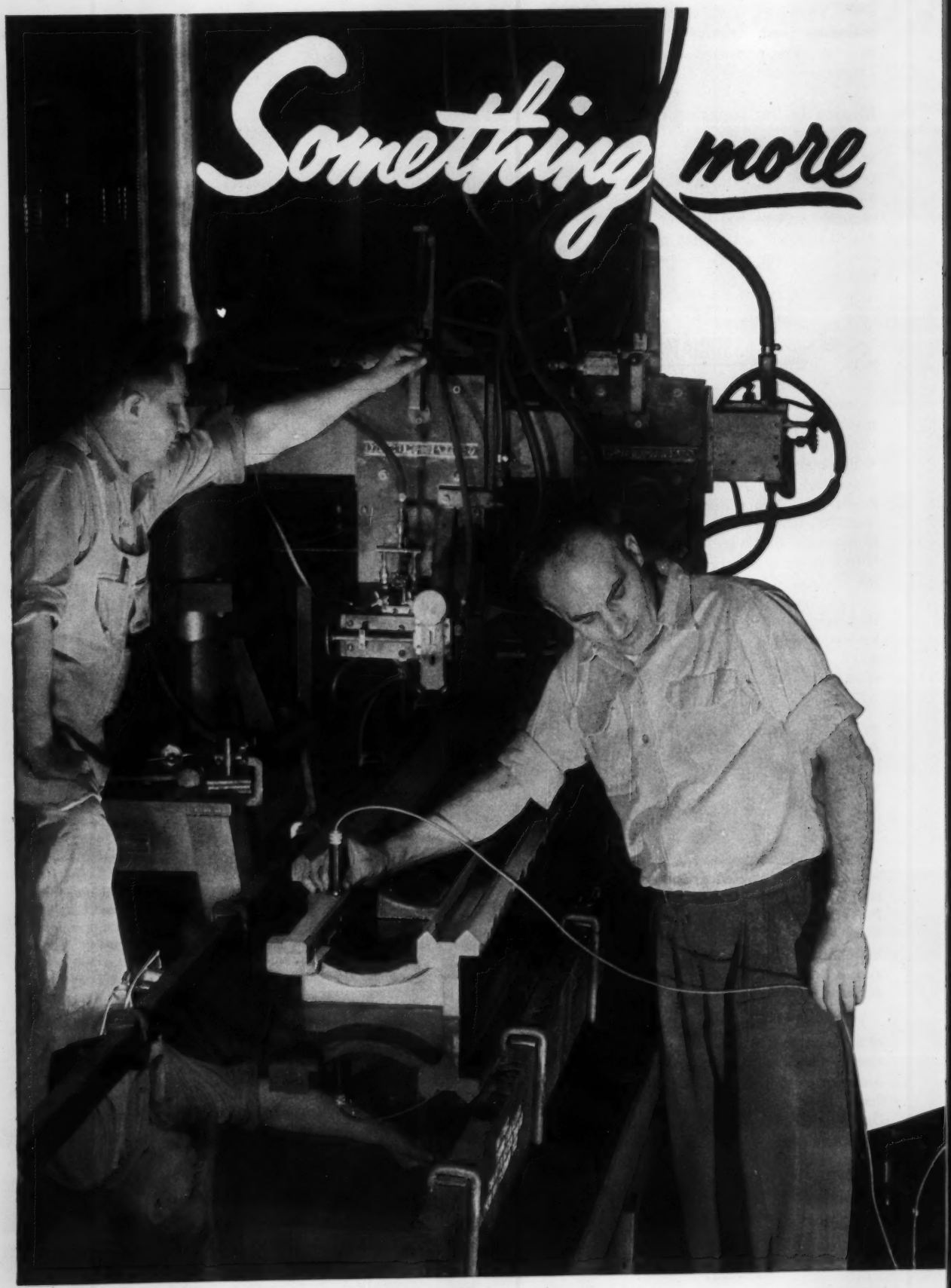

Something more

# *than quality control...*

## makes *Hendey* lathes life-long money-makers in your toolroom or shop!

"We cannot produce a bad motor car. The guards would not permit it to leave the factory!" This statement was made by the executive head of Rolls-Royce, Ltd. Here at Barber-Colman Company, we sense the same devotion to perfection that marks the craftsmen who produce these fine automobiles.

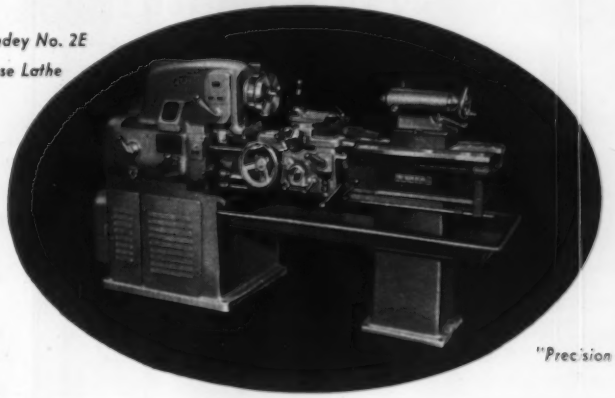
At the left you see the exclusive induction hardening machine which is used to harden all Hendey bed ways. The inspector is checking the hardness of the ways with the most modern electronic comparator. The ways for both the carriage and tailstock are integral with the bed and are precision ground after hardening. Greatest possible accuracy and maximum wear resistance are qualities of the finished ways.

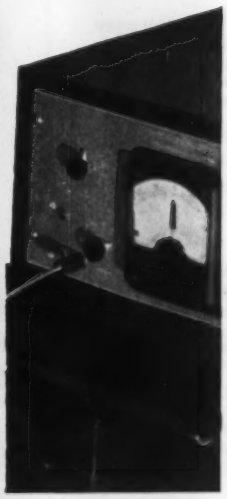
We are proud of the quality we build into our machines — proud of the exclusive features that have been designed into them.

For example, our No. 2E 14 in. General Purpose Lathe is equipped with an *electronically controlled* drive that provides infinitely variable spindle speeds between 15 and 1500 rpm. This feature increases operator efficiency, produces higher torque at low speeds, and permits changing speeds smoothly while the machine is under load.

These and other Hendey features mean profitable operation on toolroom or production turning jobs. Your Hendey dealer will be glad to discuss your machining problem with you. Call or write him today!

*Hendey No. 2E*
*14 in. General Purpose Lathe*





*"Precision with Production"*

**Hendey machine division**
**BARBER-COLMAN COMPANY**
**29 LOOMIS ST., ROCKFORD, ILLINOIS**

BARBER COLMAN

# How Did Wyman-Gordon Cut Out ALL Lost Production Time In Moving a Machine Shop?

## ←Here's the answer

The old-timers said it couldn't be done in less than five days — but Barry Leveling Mounts so speeded the reinstallation of lathes, millers, and grinders that the entire moving operation took only a two-day weekend. The vital test-preparation department was ready for work again on Monday morning. The machines set on Leveling Barry Mounts required no drilling of floors, no lagging, no shimming — they were just spotted according to plant layout, and quickly leveled. And because Barry Mounts isolate vibration, the machines do not walk, building-borne noise is reduced, and the accuracy of the precision machines in the Test-preparation Department is protected.

*Ask Barry how YOU can cut machine-moving costs.*

## How Did Bullard Stop ALL Toolroom Rejects Due to Vibration?

With the Bullard Company's toolroom only 50 feet from a main-line railroad track, the vibration from passing trains often caused work spoilage or lost time as grinder operators waited for trains to pass. Moving the toolroom was out of the question. But the seven surface grinders were isolated from external vibration by a simple installation of Leveling Barry Mounts under each machine — at a cost of only $50 per machine. Rejects due to vibration were completely eliminated!

*Ask Barry how YOU can protect precision machinery.*

## How Can YOU Gain These Advantages?

It's easy. Write for our plant survey booklet M-256 that tells you where to look for savings in your plant, then talk over your machine-mobility needs and vibration problems with a Barry representative or Barry Mount distributor.

**BARRY CONTROLS**
INCORPORATED
SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

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926 PLEASANT STREET, WATERTOWN 72, MASSACHUSETTS

## STEEL's 1956 Management Series . . .

The editors of STEEL herewith present the first in their ten-part series, Program for Management for 1956. The complete list:

1. **It's Time To Grow** (Feb. 13)
2. **Know Your Costs** (Mar. 19)
3. **Ideas for Industry** (Apr. 23)
4. **Metalworking Goes to Market** (May 14)
5. **Metalworking's New Horizons** (June 18)
6. **How To Live with SUP** (July 16)
7. **To Merge or Not To Merge** (Aug. 13)
8. **Motivating Men To Produce** (Sept. 24)
9. **Automation— Bogeyman or Bonanza** (Oct. 15)
10. **Industry and College— Partners in Development** (Nov. 12)

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

# It's Time To Grow . . .

"IF YOU stand still, you will fall back. If you go ahead slowly, you will do little more than stand still."

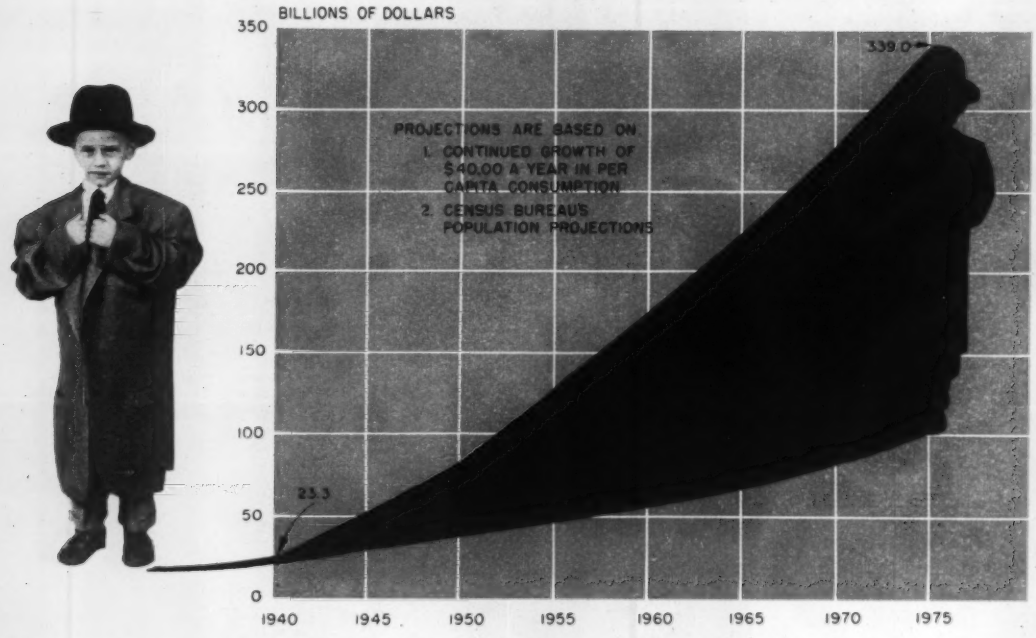
The point Thomas M. Evans, president of H. K. Porter Company Inc., Pittsburgh, was making is this: You'll have to grow substantially to hold on to your present percentage of the market. You'll have to grow even more than that to boost your share.

Suppose your industry's sales are $400 million a year, and your company's share is $10 million. You're getting 2.5 per cent of the business. If the industry's sales grow to $520 million by 1960 and your company's sales climb to $12.5 million, you will have lost ground! Your share of the market will be only 2.4 per cent.

## You'll Have To Grow

Mr. Evans has plenty of evidence to back up his analysis. Take the projected growth of the metal-

# The Metalworking Industry's Sales Will Grow . . . Will Yours?




working industry (see chart, p. 82). By 1960, its dollar volume of sales should be 36 per cent greater than it is today. Another 28 per cent climb is projected for the following five years. By 1975, the volume could well be 165 per cent above what it is now.

Such projections might be conservative. They are based on two assumptions: 1. There'll be no increase over the $40-a-year rise in per capita metalworking sales (that's the annual increase during the last 15 years). 2. Population will increase in accordance with the projections by the Census bureau (see chart, p. 83).

Note that the growth in metalworking sales is not predicated entirely on population. People are important. Without them there would be no customers. But look at China and India. They are packed with people. Yet those countries are poor markets.

**We Have It** — In addition to people, there must be a strong desire for products, and a means of supplying wants. The U. S. has all the requisites: 1. An expanding population. 2. A rising standard of living. 3. Unmatched productive facilities. 4. Increased productivity. 5. Increased buying power. 6. High employment. 7. A big supply of raw materials.

Metalworking enjoys those benefits plus one more: An increasing use of metals. In 1900, the per capita consumption of steel in the U. S. was 300 lb a year. Now the figure is 1418 lb (see chart, p. 85). Why?

We are using more products than we did in 1900. We are showing a growing preference for metal products. And we are buying replacements frequently because improvements are coming so fast. A fourth factor—growth in family formations—should be felt in another five years.

## Be Ready by 1960

Babies arriving in the big birth rate increase during World War II will reach marriageable age (20 to 24 years) around 1960. In the five years that follow, their ranks will increase 19 per cent. By 1970, there will be 60 per cent more marriageable consumers than there are now.

**Bride and Groom**—Family formations are important because of their needs. Six people (a man, his wife and four children) will have only one lawn mower, one refrigerator, one kitchen stove and probably only one automobile. If the same number of people are three couples just getting married, each couple will want a lawn mower, a refrigerator, a kitchen stove and an automobile—all of which take metal.

If your products are for the consumer market, look at the composition of the population. It will make a difference whether you produce baby buggies or easy chairs. The number of children and the number of people over 50 will increase. The middle-age brackets will remain about stationary, or maybe decline a little. Census bureau projections show the 1970 population of children under five will be 17 per cent larger than it is now; people over 50 will be 40 per cent more numerous; while the

number of those 30 through 49 will remain unchanged.

### Billion-Dollar Bets

How accurate are these projections? The steel, auto and electric power industries are betting billions of dollars on them. Steel is scheduled to spend $1.2 billion for new equipment and construction this year—a record annual outlay. A survey by the American Iron & Steel Institute shows iron and steel companies plan to add 15 million tons to the nation's steelmaking capacity within the next three years, with more to come.

This year, the automobile industry will spend $1.8 billion for expansion, not including new model tooling costs. Ford will spend $1 billion in the next three years, half in 1956 and the rest in 1957-58.

The electric power industry will lay out $3.75 billion in 1956. By 1970, it will have almost tripled its capacity.

### We Have the Money

Money needs for expansion will run into the billions. Capital will be available if the projects are sufficiently attractive to investors. Since 1929, the country's money supply (in terms of 1955 dollars) has grown 89 per cent, while population has increased only 35 per cent. This situation also makes better customers. They have more money and they spend faster. Over the last 13 years, the turnover of demand deposits in six centers has climbed from 18 to 25.5 times a year.

### How To Expand

There are several ways to do it: 1. Productwise. 2. Facilitywise. 3. Organizationwise.

Whichever route you take, study, plan and engineer your expansion. There's no necessity for emergency moves which are designed more to get out immediate production than to make a plant useful for many years.

Planned and engineered growth —expansioneering—will pay off in efficient production and longer usefulness of the plant.

### Expansion: Productwise

By adding products, you can retain your present product line but garner a larger proportion of the market. This calls for increased selling efforts. If you have surplus plant capacity, you can accommodate this extra business without capital investment. If you have no open capacity, perhaps increased production efficiency would turn out the extra volume needed to expand sales.

Diversification is another avenue. Whether this will require expansion of facilities depends upon whether the new products can be produced with your present equipment and whether you have surplus capacity.

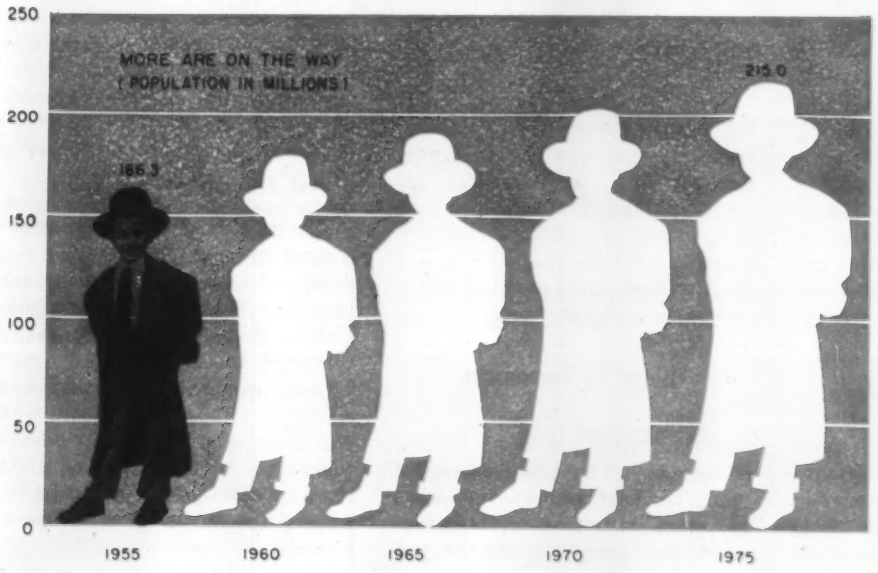
### Expansion: Facilitywise

You can round out present facilities; build from scratch; or buy, lease or rent an existing building.

### Rounding Out

The steel industry will expand its capacity about 15 per cent by rounding out its facilities. Unless more productive ways of making steel are adopted widely, the industry will be unable to tuck any more capacity into its existing plant. Its next move would necessitate building new plants from

## Outlook for Customers in U.S.

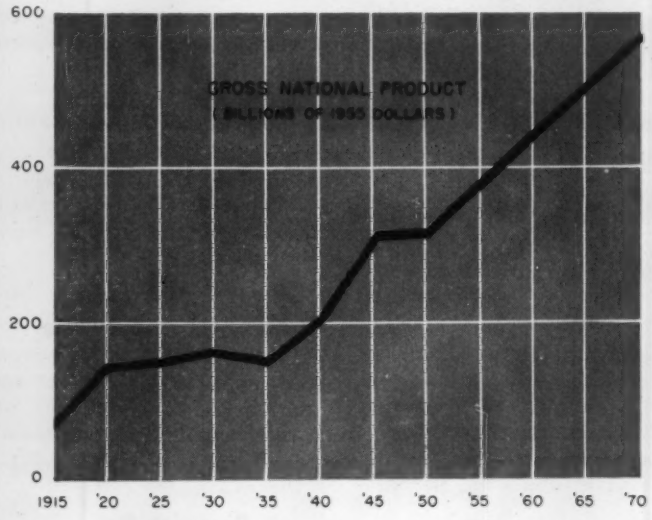



**They'll be better customers because they'll form more families**

People of Marriageable age (20 to 24 years)

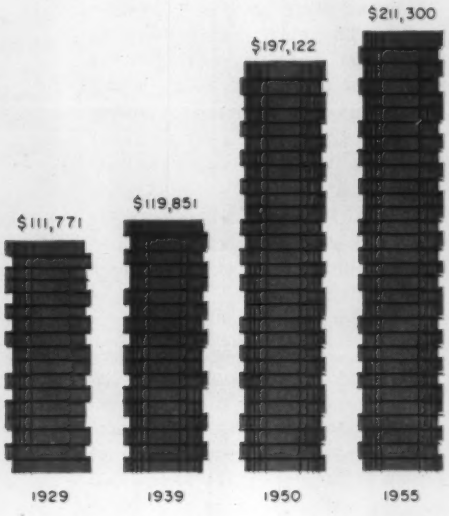
| | |
|---|---|
| 1955 | 10,766,000 |
| 1960 | 11,276,000 |
| 1965 | 13,461,000 |
| 1970 | 17,301,000 |
| 1975 | 19,281,000 |

## Projection: 1955 to 1970




## More Money To Work with

(Millions of 1955 dollars)




scratch, such as U. S. Steel Corp. did several years ago when it built the Fairless Works in eastern Pennsylvania. The handicap here is cost.

The construction industry is in a boom, and this contributes to high construction costs. A new steel plant, along with the development of the necessary supplies of raw materials, will cost $300 to $325 an annual ingot ton. Twenty-five years ago the cost was $50. Republic Steel Corp., Cleveland, which is rounding out its facilities, calculates its cost will be $85 an ingot ton. Republic's $152 million program is as far as it can go in this direction. Any further addition of capacity will require construction of plants from scratch.

### Rent, Lease or Buy

Renting is chiefly a short-term thing. It can provide space until a permanent plant can be obtained or decided upon. Monroe Calculating Machine Co., Orange, N. J., is a case in point. In looking for plant sites, Monroe liked Bristol, Va. To test its judgment, Monroe rented three lofts there in 1946. After it had become evident Bristol was satisfactory, the company bought a plant site the next year.

To reduce capital outlays and spread "housing" costs over a long period, some companies prefer to lease a building that has been built specifically for its needs, or meets its needs.

Sometimes a new or used building can be bought more advantageously than you can build one. Rockwell Mfg. Co., Pittsburgh, recently purchased a new plant at Statesboro, Ga., which a company found it didn't need before it moved in. Rockwell will produce meter and valve products there.

### Things To Remember

Whether you rent, lease or buy facilities, there are many factors to consider. Those that determine plant location remain the same (markets, labor supply, transportation, raw materials, utilities and fuel), but increasing attention is being paid to:

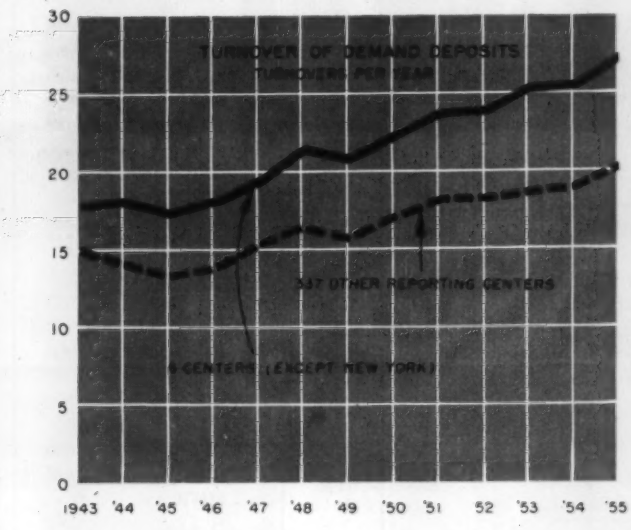
1. The community's attitude toward industry.
2. The local government's attitude and policy toward control and taxation of industry.
3. The labor force's composition, attitude and leadership.
4. The community's cultural, recreational and health facilities and the probable future need for industrial support in providing adequate resources.

### If You Build Your Own

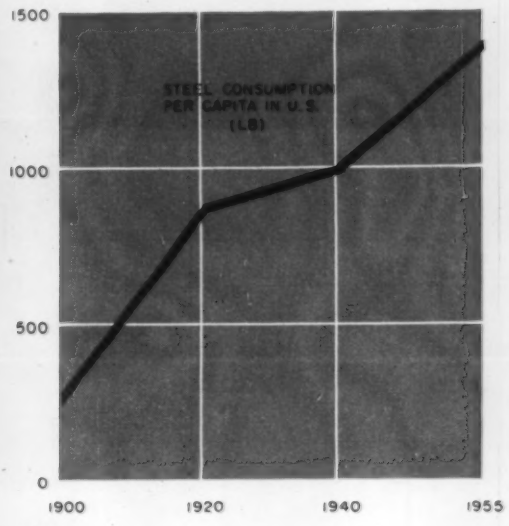
The location of new plants is becoming increasingly exacting because: 1. Construction costs are high. 2. Their design is so specialized that they are not easily converted to other uses.

Some companies feel they are equipped with staff members who can study and weigh the advantages and disadvantages of plant sites. Other companies prefer to employ specialists—plant locating services.

## People Are Spending Faster




## Our Standard of Living Is Going Up




New York City is omitted because its figures are distorted by financial dealings

The task of choosing the right site has been made more difficult by the trend toward small towns. While they offer many advantages, there also are definite risks including: Dependence upon a small labor pool, limited transportation and supply resources and the possibility that the community may resent the plant's presence.

What the "small-town" attitude can do to an "outsider" was impressed upon one small company the hard way. Within six months after it opened a new plant, residents of the community refused to work in it because of resentment toward the company. This situation existed before the company's arrival, and it billowed up after residents worked in the plant long enough to substantiate their opinions. The company was forced to leave town.

### Six Steps to a Plant

Plant selection methods vary from company to company, but they will fall in a broad pattern of procedures. In most studies of new sites, you will follow six steps:

1. Set up an organization to deal with the problem.
2. List requirements of the new plant.
3. Select the general area where the plant is to be located.
4. Screen communities within that area.
5. Compare candidate communities and arrive at a final choice.
6. Select a site within the chosen community.

### Step 1: Organize

The size of the organization needed to choose a new plant site varies from company to company. In some, the job falls to one or two men. In others, departments devote time to the task.

### Step 2: List Requirements

Specifications for the new plant usually are set up in great detail by the manufacturing or operating department. In turn, these specifications are often translated into physical requirements by the group conducting the plant location survey.

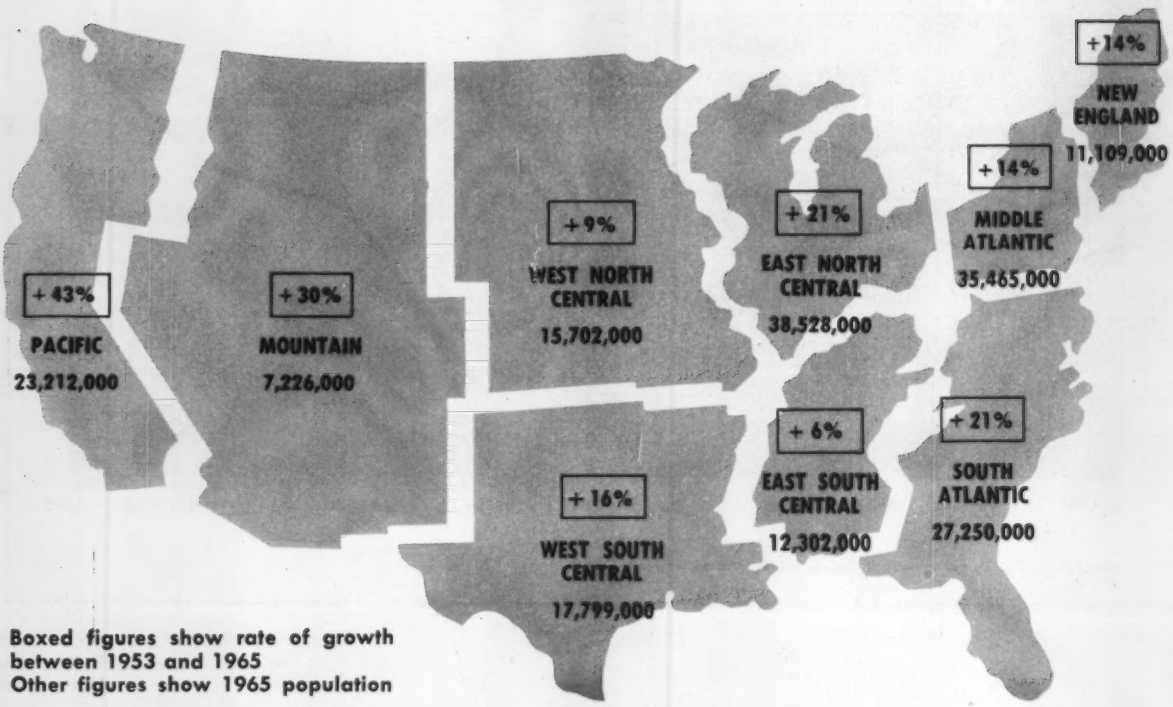
### Step 3: Choose an Area

When specifications for the new plant have been formulated, the general area in which it will be located is chosen. It may encompass anything from a few square miles to an entire geographical region. If you are shipping a product like metal cans (shipments that embody a lot of air), you'll want to place your plant near the customers. If you are going to draw upon a wide area for materials, you'll have more latitude in locating your plant.

### Step 4: Screen Communities

Screening begins after the general area has been determined. You must find out everything you can about a community—what it is and what it is likely to be, its advantages and disadvantages. Some companies prefer to dig out these

## Some Areas Will Grow Faster than Others . . . but There'll Be No Change in Rankings in 1965




**Boxed figures show rate of growth between 1953 and 1965**
**Other figures show 1965 population**

data themselves, while others delegate the task to a factory locating service.

The depth of a good study is illustrated in a report a factory locating service made on a Mississippi town for Rockwell Mfg. Co. It showed that townspeople went to bed early; there weren't the big city lures like night clubs and other entertainment that rob people of sleep. Conclusion: That small town's residents could be expected to be rested and ready for a full day's work.

**Plan of Attack**—Lloyd A. Dixon Jr., a vice president of Rockwell, which has built five major new plants in five states in the last five years, has this to say about screening:

"During the early stages, we try to establish the broadest possible personal contact between our management people and a broad cross section of community residents.

"We study the files of the community newspaper, poke quietly into current political, economic and social activities of the town. If there are any other industries in town, we talk at some length with the management of each—getting a line on community attitudes and sense of responsibility."

**Take a Walk**—"We depend, too, on our own modest powers of observation. We walk along the streets of this proposed plant community and notice the homes, the lawns, the churches, the parks, the schools, the waterworks.

"Why? Because these little things reveal so much about a community and its residents. Do the people take personal pride in the appearance of their lawns and homes? Do they keep up their schools and churches and parks? Are there enough of these and other important institutions and facilities to meet the requirements of the population? If not, are these people actively and realistically trying to meet these needs?

"The answers to these questions," Mr. Dixon says, "give us a good inkling of the basic character and attitudes of our proposed community partner.

"If we don't find a community doing these things on its own, we tend to stay away. We want partnership in a going concern—not the role of wet nurse and rich uncle," Mr. Dixon declares.

**Good Question** — In screening communities you will want to make this decision: Shall we reveal the identity of our company when we visit prospective plant-site cities?

Among reasons for keeping it secret are: The fear that land prices will rise if it is known who is interested in the area; fear that turning down a community may generate ill will against the company; and a dislike of pressure on the company to locate at a specific spot.

In contrast, some companies prefer to announce their identity in the belief that straightforward negotiations build respect for the company and allow it to learn quickly the community's reaction.

## Step 5: Compare

When all the data on communities have been assembled, they must be weighed. Some companies like to put the most important data down on a rating sheet to help decide which community is the most advantageous. The company must have determined factors which it thinks are most important to its operations. Usually, a community is selected because it offers the optimum combination of favorable factors.

**Long Look**—In weighing factors, look farther than construction costs. While they may differ from one community to another, the difference won't amount to as much as variations in annual operating costs. Most companies like to develop costs of operating in each prospective town before a specific town is chosen.

You'll want to figure in taxes, too. Tax policies sometimes can be the deciding factor in narrowing down the area. They influenced Warner Electric Brake & Clutch Co., Beloit, Wis., to locate a $1-million manufacturing plant (to be completed by mid-1956) in Illinois. It's just over the line from Wisconsin and 3 miles from its Beloit plant and headquarters. The company's president, Steven P. J. Wood, says: "We looked at several sites in Wisconsin, but the cost of manufacturing in the state made it extremely uneconomical for us to operate there. The state tax situation makes it much more advantageous to locate in Illinois. Because of this, we were forced to by-pass Wisconsin."

## Step 6: Select the Site

After a town has been selected, a site must be chosen. Among the many considerations: Is it above flood level? Are there sufficiently large sewer, water and gas lines? Is there room for growth? Is there enough water to keep down property insurance rates? Is the ground solid enough to hold the weight of your plant and equipment? Are new superhighways likely to cut through the site?

It's not only wise to check those matters, but it's advisable to cross-check on them. Sometimes, a community and its people are so eager

## Before You Locate a Plant, Check These . . .

### 1. COMMUNITY

Its people
Its appearance
Housing
Climate and weather
Size
Living costs
Cultural life
Social life
Public service (fire and police protection, garbage disposal)
Shopping facilities
Property insurance rates
Financial facilities and resources
Political conditions

### 2. SITE

Susceptibility to disaster
Altitude
Room for growth
Topography
Make-up of soil
Accessibility
Transportation
Parking space
Fire and police protection
Neighborhood
Cost of land
Taxes and assessments
Availability of clear title
Conflicting highway plans

### 3. LABOR

Quantity
Ratio of men to women
Quality
Wage scales

### 4. MATERIALS

Proximity (time and distance) to supply

### 5. MARKETS

Proximity (time and distance) to customers

### 6. UTILITIES, FUELS

**Electricity**

Supply
Rates

**Gas**

Supply
Pressure
Rates

**Water**

Quantity
Quality
Pressure
Temperature
Rates

**Fuel oil**

Supply
Price

**Coal**

Delivered cost

**Heat**

Buy
Make

**Sewers**

Size

**Telephone, telegraph**

Service
Rates

### 7. CONSTRUCTION COSTS

Hourly rates of construction workers
Materials costs
Kind of construction required by weather and community

### 8. STATE AND LOCAL REGULATIONS

Zoning
Building codes
Restrictions on pollution and noise
Tax rates and property valuations
Assessments
Labor laws

## Experienced Planners Will Tell You . . .

1. Have a long-range program, but make it flexible
2. Don't allow minor downturns in business to influence your plans. Over the long haul, the ups are greater and more prolonged than the downs
3. Know your market potentialities. A market analyst can help you
4. Make sure your new plant would be welcome in the community
5. Beware of offers of free land or tax exemptions. Industry can't thrive on material assets and tax "breaks" alone
6. If you must build a plant, know all you can about possible locations. You may want the help of a factory locating service
7. Decide whether you want to let the identity of your company become known during negotiations for a site
8. Fit the plant around your processes, not the processes into the plant

to obtain a plant (particularly in these days when industries are sought to help carry the tax load) that informants are careless with the truth. A North Carolina community blithely "forgot" to tell that the site it was suggesting to Rockwell Mfg. Co. was below the level of the city sewer.

### Expansion: Organizationwise

In taking this tack, you acquire existing facilities through purchase or merger. Outstanding in the use of this technique is the H. K. Porter Company Inc. (with 13 divisions). Its interests are in electrical equipment, industrial rubber, refractories and steel.

Mr. Evans, its president, says: "So far, we have found it easier and less expensive to buy a company and to develop its potential than to start something brand new.

"As long as this condition exists, we expect to continue our acquisitions. Think of the tremendous expense and effort, if, for example, any of us today wished to start a new steel producing concern in Birmingham, or elsewhere, similar to our Connors Steel Division. To start such a company would take considerable time and money merely to staff its upper echelons. It would take, no doubt, close to two years to build and put into operation such a plant, and then, of course, customers would have to be developed.

"How much quicker and usually more economical it is to purchase a concern in a given field, and thus secure overnight its engineering staff, technical knowledge, plant, products and customers!" Mr. Evans exclaims.

A study a few years ago showed that more than two-thirds of the buildings and concerns that were acquired were in the northeast and north-central parts of the nation. Reason: The age and high state of development of these areas. Lesser numbers of available properties exist in the newer and developing regions, the South and the West.

### Which Way To Go?

Rapid growth of the South and the West offers many business opportunities. But the older industrial regions aren't decaying. Percentagewise, the fastest growing regions between now and 1965 will be the Pacific division (Washington, Oregon and California) and the Mountain division (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah and Nevada). Census bureau projections indicate a 43-per-cent climb for the Pacific division and a 30-per-cent jump for the Mountain division (see chart, p. 86). Even so, they won't catch up with older regions. Over the same period, the East North-Central division will have a population increase of 21 per cent, and the Middle-Atlantic division will have 14 per cent more people.

Before making a move, equip yourself with a thorough analysis of present and prospective markets.

### The World Beckons

You may even want to become international in your outlook. Don't overlook Latin America. That's the counsel of Dr. Luis Machado, executive director of the International Bank for Reconstruction & Development, Washington. He says: "Some day the enterprising American, who has been pouring billions of dollars into other areas, will take a serious look at the great family backyard lying to the South, just like a century ago he took a look at the great expanse of virgin territory west of the Mississippi river.

"Everywhere in Latin America, the process of growth is present. Everywhere, economic development is progressing at an accelerated pace. And, consequently, everywhere there are excellent opportunities for sound and profitable investment," Dr. Machado declares.

A long period of international development lies ahead, opines Murray Shields, partner, MacKay-Shields Associates, New York. It will be international in scope because modern methods of transportation are welding the western nations into one world. Within a decade, most of our large corporations, he predicts, will have their shares and bonds listed and actively traded on stock exchanges throughout the Western World; many of them, he thinks, will receive a large part of their net income from foreign productive and distributive operations.

Where you expand is for you to decide, but one thing is certain: It's time to grow!

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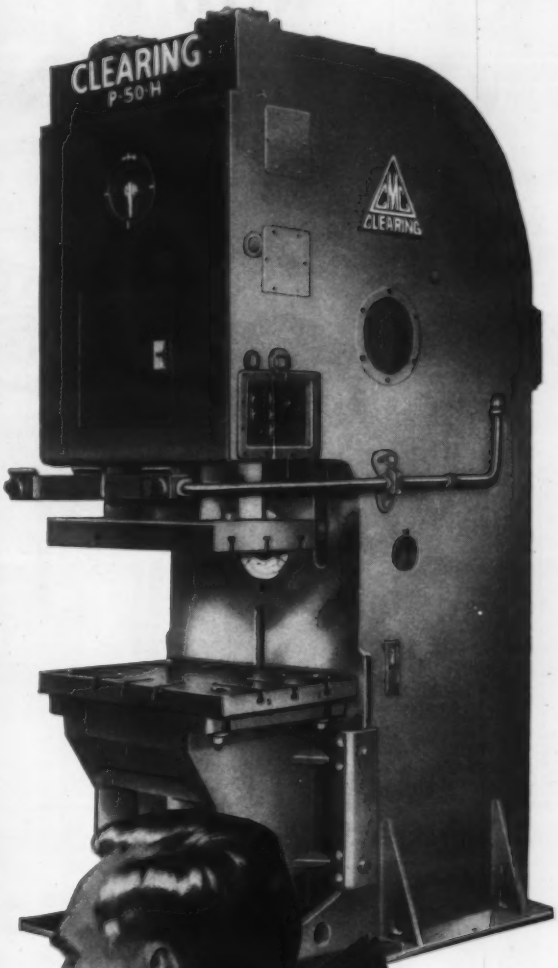


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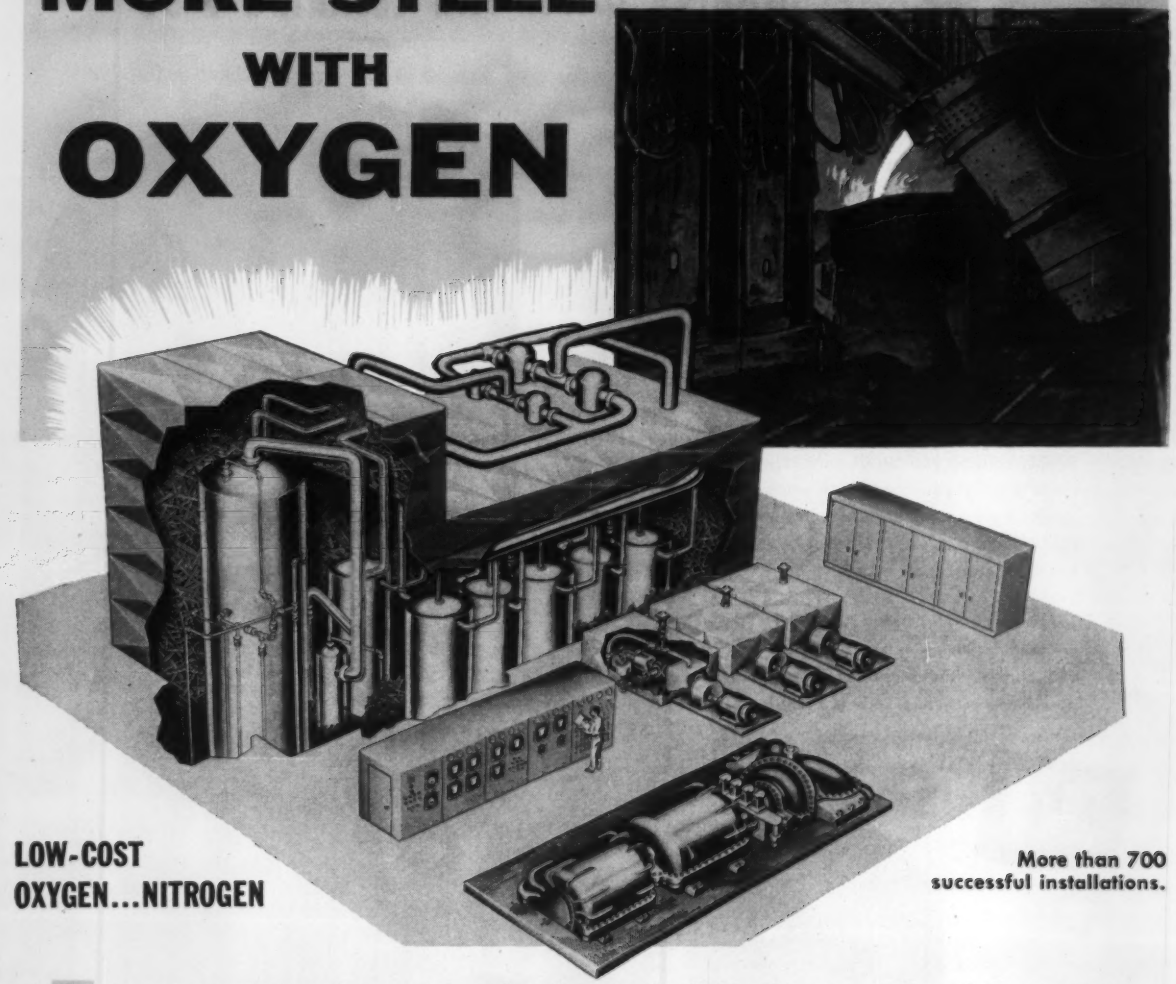

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# Technical Outlook

**RUBBER BALL BEARINGS**—A maker of electric sanders finds that rubber balls carry the thrust and dampen vibration better than other materials. Used between the sanding pad and the motor, the neoprene balls transmit pressure from the operator to the pad, resist paint solvents and wear longer in wet conditions.

**ARC RESISTANCE**—Up to 1000-per-cent improvement in the arc resistance of phenolic insulating materials is reported by Westinghouse. It is achieved by separating molecules of the resin with particles of inert oxides, such as silica and alumina. The oxides keep the resins from breaking down into conducting compounds under strong electrical discharge.

**ELECTRIC NOSE**—Semiconductors that can detect minute quantities of a contaminant in otherwise clean air are being studied at Purdue University. Absorption of gases on the semiconductor surfaces changes the difference in their contact potential. It may be possible to make the detectors discriminate between kinds as well as quantities of contaminants.

**TUNGSTEN GLOVE**—Feed-finger pads for automatic screw machines last 15 to 20 times longer when spray coated with tungsten carbide (the Linde process), according to Edgcomb Steel of New England, Inc., Milford, Conn. Stock scratches and short rejects are reduced. Up to 5 per cent more production is claimed because of less down time

**JOINT POINT**—Consumable backing rings eliminate crevice corrosion and joint contamination in alloy steel pipe welds. In a recent report the point was made that a root pass with a tungsten-arc, inert-gas torch makes the consumable backing ring into a joint with smooth internal walls, prevents contamination in pipelines handling radioactive fluids.

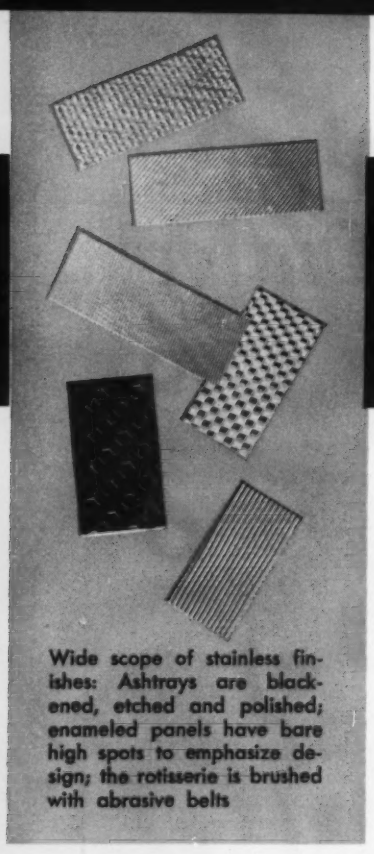
**CLOSER TO REALITY**— Standards for testing the dielectric strength of transformer oil are inadequate for modern power equipment, says GE. The company will propose that the ASTM adopt a testing method which more nearly simulates operating conditions.

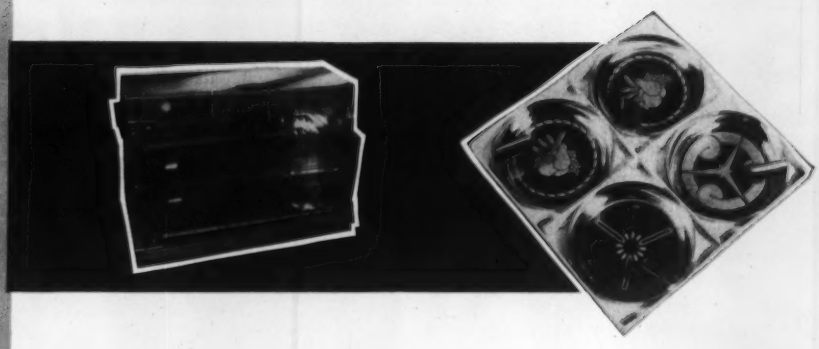
**ROTON**—Dumbbell rollers, a shaft (it can be threaded), a roller retainer and an outer, cylindrical raceway form what is described as a gearless, mechanical torque converter or a bearing that crawls up and down a screw. Possible uses: Auto window lifts, power seats, retractable antennas, sliding refrigerator shelves and retractable deep wells in stoves.

**METAL LINING**—Heat-treating furnace hearths made of cast jointed metal plates have advantages in wear resistance and thermal conductivity, says Fonderies de Mazieres, the French firm making them. They can be used to 1920° F in oxidizing and carburizing atmospheres.

**ULTRASOUND METHOD**—Paper and cloth are being impregnated with insulating fluids ten times faster with ultrasonics. GE says that ultrasonics are being pushed to replace the water and air contents of materials with insulating fluids. A big improvement over the conventional pressure-vacuum cycle, this method results in better insulation and electrical parts that operate more quietly.

*Metalworking Outlook—p. 35* *Market Outlook—p. 129*





Wide scope of stainless finishes: Ashtrays are blackened, etched and polished; enameled panels have bare high spots to emphasize design; the rotisserie is brushed with abrasive belts

# The Finish That Fits

## Stainless steels come in seven mill finishes. Here's a list of what they are and what you can do with them

SELECTING the right finish for stainless steel today isn't a question of availability—it's a matter of taste. Wide varieties—grinding, polishing, buffing, painting, enameling, embossing, goldtoning, blackening, etc.—offer almost unlimited possibilities.

**Decoration** — Modern designers like to use the whole range of finishes, even though most users are content with mechanical finishes like grinding or as-rolled. Designers can enhance the luxurious appearance of stainless by adding colors, plating and etchings.

The ability of stainless to retain discontinuous or partial coatings makes it unique among metals. More common or base metals spall or peel in the coated area.

One user reports that an all-over, rolled, embossed design is successful for clock cases and decorative panels. The study of embossing in combination with colors, plating or partial coatings is a promising field.

**Joints** — There are decorative uses for seams and welds. Woodworking joints, for instance, are admired for their craftsmanship. This kind of designing is gaining recognition for products that don't require resistance to corrosion or contamination.

Shielded arc welding must be used for decorative welds to eliminate spattering. The surface of the weld can be brushed, electropolished or pickled with a solution of 10-to-15-per-cent nitric and 1½-per-cent hydrofluoric acids. Be sure to use clear, warm water for a final rinse.

**How** — Conventional techniques and equipment are generally used to finish stainless. Some significant differences are the result of qualities peculiar to it—corrosion resistance, toughness, high strength and hardness. They should be considered by users when making selections (see chart, page 93).

For example, stainless resists corrosive substances except when the surface is contaminated with iron. When selecting a finish, be certain that the equipment (like brushes) and materials (like buffing compound) do not contain iron or steel. Brushes should be made with stainless steel bristles and buffing compounds must never contain rouge. These rules apply as well to tumbling and ball burnishing.

If you select electropolishing, keep in mind that losses of 0.001 to 0.002-in. are common and this can replace some final machining and deburring operations. Deep dents and scratches will not be cleaned up and must be ground beforehand.

Electropolishing gives a brilliant surface without the disadvantages of cold work and heat from mechanical polishing and buffing. Limitations: It does not remove embedded particles, and the surface is not like one that has been buffed.

**Surface Preparation**—The forming method, rather than the finishing operation, determines how a piece is prepared. Many utensil manufacturers are content with a simple, trichlorethylene degreasing. Other users require an additional washing in warm, soapy water to get all the grit and abrasives.

Whiting and a 10-per-cent solution of sodium citrate will remove

## HOW and WHY of STAINLESS FINISHES

| OPERATION | WHY | START WITH | MATERIALS & EQUIPMENT | RESULT | APPLICATION |
|---|---|---|---|---|---|
| **Grind Polishing** | For size; to remove excess weld metal, tool marks, other surface damage; to improve appearance; to gain corrosion resistance; to prepare for further finishing | Rough finishes & finishes marred by fabrication | Stand, swing, flexible shaft, air or electric portable grinders; polishing lathes; fixed or hand abrasive belt or sleeve machines; rubber or resinoid bonded wheels, coated abrasive strips, sleeves or discs | Uniform bright surface. Scratches depend on fineness of abrasive used in final operation, are quite uniform | Fine abrasives for architectural applications, cabinets, commercial kitchen and lab equipment, utensils, etc., or preparation for finer finishing processes |
| **Buffing** | Smoother, brighter surface than polishing can produce | No. 2 strip finish, No. 2B or No. 4 sheet finish if not marred. Otherwise, ground and/or polished surface free of all but minor marks | Stand, swing, flexible shaft, air or electric portable grinders, polishing lathes, with fabric buffs and fine abrasives | Smooth, bright, highly reflective surface, with abrasive marks barely perceptible. Mirror finish if fine abrasive used in final operation | Reflective surface as in household appliances, auto trim, sanitary equipment, jewelry, tableware |
| **Satin Finishing** | Soft, lustrous, low-reflective surface | Surface uniform and free of defects. Can use No. 2 strip or No. 4 sheet (No. 2B sometimes used if not marred); otherwise grind and polish to equivalent of No. 4 | Same as for buffing but with tampico brushes instead of wheels, or with wicking wheels (sometimes buffs) and special abrasives | Smooth, uniform, lustrous surface, not highly reflective | For high quality surface, not highly reflective. Examples: Architecture, tableware, appliances. For decorative contrast with brighter surface |
| **Barrel Polishing** | Smooth bright surface on parts difficult to buff | Surface free of all but minor marks | Equipment similar to barrel tumbling, but imparts gentler motion. Stainless steel balls and soap and water or similar media. Fine abrasive instead of balls for finest finish | Bright surface similar to that produced by buffing | Same as buffing, on parts difficult to buff |
| **Engraving** | Designs, legends, etc. | Polish, polish and buff, polish and satin finish | Engraving machines, often of pantograph type. Stainless steels can be hand engraved | Design pattern engraved into surface | Flatware, holloware, plaques, tablets, nameplates, decorative panels, etc. For greater contrast, lines may be filled with enamel |
| **Etching** | Same as engraving | Same as engraving | Bath of strong chemicals, with stainless surface suitably masked | Lines chemically etched into surface | Same as engraving, generally only on flat surfaces |
| **Electropolishing** | Particularly suited for wire products or shapes difficult to buff | Surface free of defects; pits, gouges, etc., can be made worse in polishing | Process is the reverse of electroplating. Some baths are patented. Work becomes anode, and cathodes may need to be shaped to fit contour of complex parts | A bright surface which cannot be duplicated exactly by mechanical methods | Wire refrigerator shelves, baskets, springs, etc. |
| **Blackening** | Produce a full black surface | Desired final finish | Hot chemical bath (process is patented but license is easily obtainable). Sometimes achieved with flash coat of nickel plating or copper plate chemically blackened | Dull, black, uniform, nonreflective finish. May be made glossy by rubbing with oil or wax. Hot bath prevents use of masking | Decorative effects as in jewelry. Also certain military and optical applications where strength and/or corrosion resistance are required, with minimum reflectivity |
| **Selective removal of blackened surface** | Produce designs, legends, pictures, etc. | Surface blackened by hot chemical method | By patent holder only | Designs may be positive or negative, as lines or dots. Dots permit half-tone reproductions of other than line figures | Plaques, nameplates, tablets, decorative effects, etc., especially if design involves shading instead of lines |
| **Painting** | Color match or color contrast | If surface is highly polished or buffed, light roughening by abrasive or chemical (such as phosphate) recommended | Any standard painting method. Special primer often recommended. A vinyl-type primer is available | Stainless steel holds paint well | Signs, designs, color match or contrast with adjacent surfaces |
| **Electroplating** | Nickel, copper chromium, cadmium, gold and silver can be plated on stainless for various effects. Copper plating may be used to improve heat distribution or for lubrication as in spring forming | Clean and smooth surface | Surface must be activated with acid bath or cathodic treatment. Activating-plating operation with one bath is often used; after surface activation (electropolishing), current is reversed to begin plating | Comparable to other metals; rust will not creep under surface of plating | Automotive trim, jewelry, cooking utensils. Copper for lubrication in cold heading and other operations. |
| **Enameling** | For decorative effect | Clean surface, may be embossed or patterned | By conventional means; only one coat is necessary. In patterned or embossed surfaces, high spots can be wiped clean before firing to give contrasting surface | With translucent glaze, metallic color effect is achieved. Leaving high spots bare will not cause corrosion or spalling | Exterior walls, architectural and automotive trim, appliances, etc. Uses are just being investigated |

No. 1 finish is a dull white

No. 2B has a brighter, denser surface

## Stainless Finish

persistent stains that resemble light rust.

**Mill Finishes**—Stainless producers have seven mill finishes, some of which eliminate final finishing. Remember that processing can partially or completely destroy a mill finish. Pick the right finish for the job.

Stainless is produced in all the common mill forms, and finishes supplied for sheets are generally available on plates, bars, tubing, etc. Stainless strip, for example, comes in two finishes. The No. 1 finish is similar to the No. 2D sheet finish, and the No. 2 finish is like the No. 2B sheet finish, although somewhat brighter.

Here are the seven finishes:

**No. 1**—This is a hot-rolled, annealed and pickled finish with a dull white appearance. It is used for operations (except severe forming) that will ruin a surface finish. Examples are extensive welding or annealing.

**No. 2D**—This finish is similar to No. 1 but is much denser. It is made by cold rolling a No. 1 sheet before final annealing. These sheets are most ductile, and the dull finish holds lubricant well for severe drawing.

**No. 2B**—A final cold rolling after annealing and pickling provides a brighter, denser surface than No. 2D. It is not so suitable for severe draws but is a better starting surface for finishing operations. There are a few applications where final finishing isn't needed.

**No. 4** — Abrasive polishing (the most popular) leaves an attractive, satin finish. It resists corrosion well. Fabrication methods should not mar the surface, although welds can be blended easily.

**No. 6**—The tampico brushes, used for this finish, leave the surface soft, satiny and uniform. Brightness and reflectivity are slightly less than No. 4. Again, fabrication methods must not mar the surface.

**No. 7**—This is a polished, semi-mirror finish that offers good reflectivity and brilliance. It will not stand abuse during fabrication.

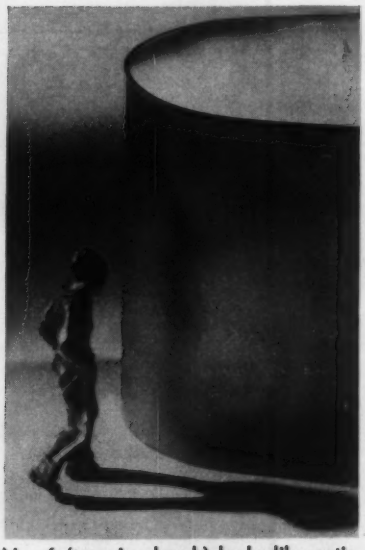
**No. 8**—This is a full, polished and buffed, mirror finish for maximum reflectivity. The best mill finish available, it may require a special order. Special protective coverings supplied by the mill should be left on.

If the product requires extra flatness, stretcher leveling can be ordered from the mill.

All mill polished sheets are carefully packed to avoid handling imperfections. Protective coatings can be specified by the buyer.

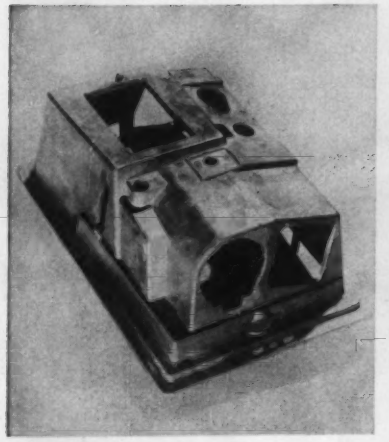
• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

No. 4 is the most popular

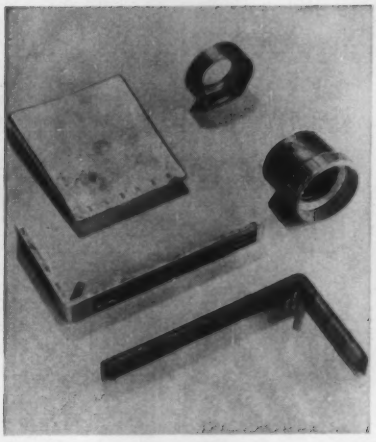


No. 6 (tampico brush) looks like satin

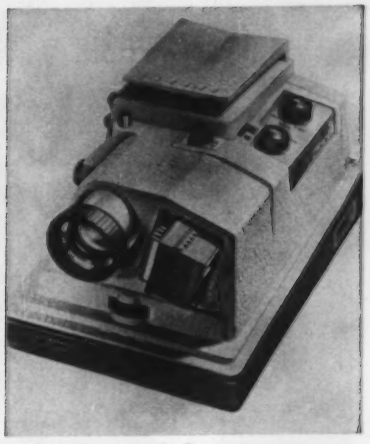
No. 7—almost a mirror



Diecast aluminum housing for Revere projector is intricately shaped, thin walled and precision cored



Other projector diecastings—twin honeycomb grilles, two lens housings and detachable hood



Revere 888, 35-mm slide projector with automatic slide changing uses six aluminum diecast parts

# Diecastings in the Picture

A NEW, 8-mm movie camera and an automatic slide projector use aluminum diecastings for their principal structural parts.

On both items, the diecast parts provide necessary strength and lightness. For more sales appeal, they allow the use of a wrinkle finish with a bright metal trim on exterior surfaces.

**Slide Projector**—The Revere 888 shows up to 36 slides automatically at a predetermined pace. It's made by Revere Camera Co., Chicago. Six diecast parts are used —the main housing, hood, two grilles and two lens frames.

The intricate housing which forms the four walls and the top is diecast in one piece. The die is cored for the lens cavity, operating control knobs, the slide magazine which passes through from back to front and elevation and level control knobs. Cast-in studs position and secure the housing to the base.

**Other Parts** — The L-shaped hood is made as a separate diecasting. Easily removed, it leaves the projector's bulb readily accessible for replacement.

The two, close-tolerance lens frames hold the lens elements permanently in position. The outside diameter of these lens housings must be accurate enough to insure a tight fit in their mounting and prevent slippage after focus adjustment.

Designed primarily for their appearance-enhancing value, the projector's two grilles mount in the front of the base and carry around the machine's sides.

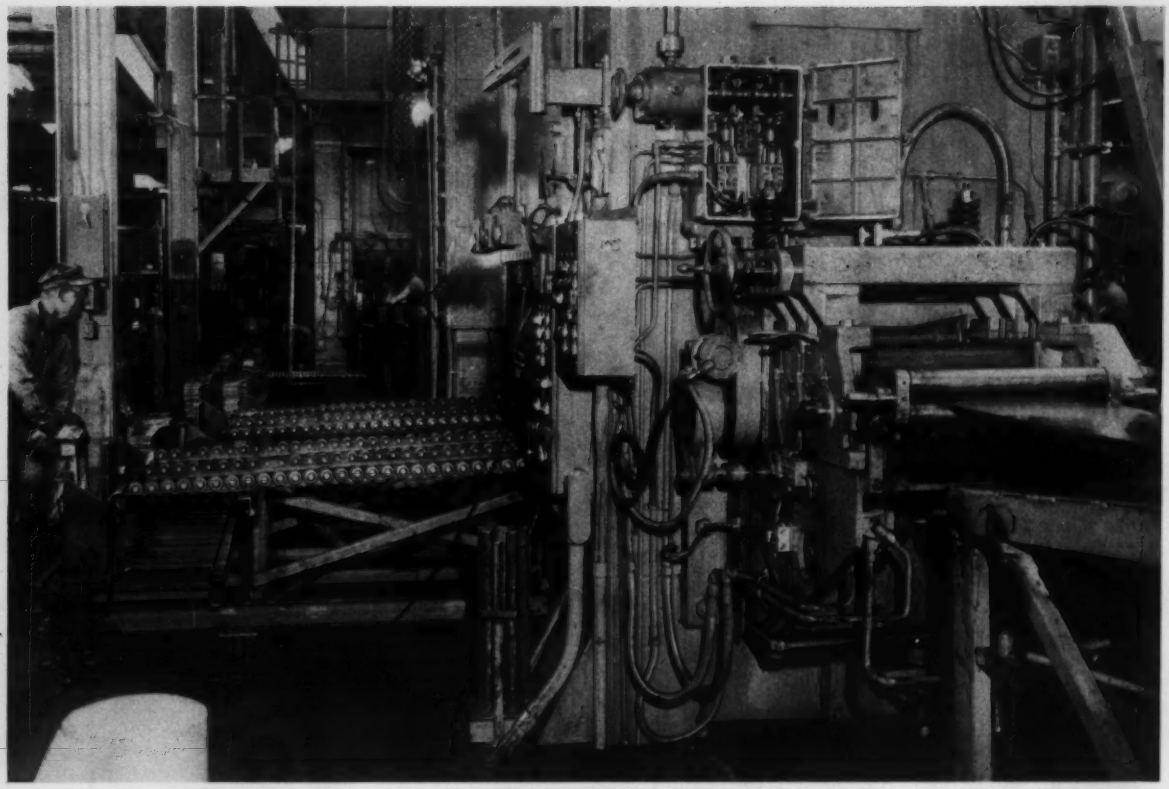
**Turret Camera**—Three diecastings form the housing for the DeJur Spectator Turret, a three-lens turret camera made by DeJur Amsco Corp., Long Island City, N. Y. The turret mount, main body and a side panel are cast in the same die. This gives economy without sacrifice in accuracy. It also assures perfect mating of the three parts.

In assembling the instrument, the lens, film and operating mechanism are fastened to the housing parts. A lens mounting plate is attached to the outside of the turret casting and an aperture plate is fastened behind. This assembly is attached to the main body through four tapped holes in the casting.

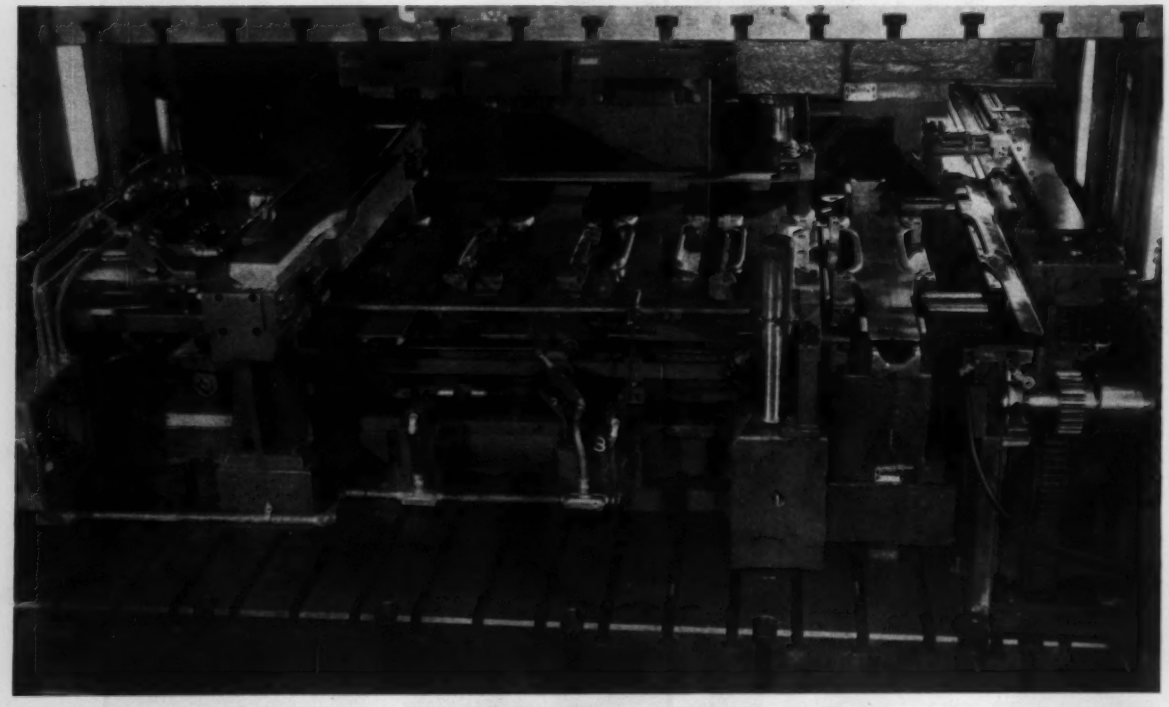
The camera mechanism is screwed to three bosses on the body casting. The side panel has a thin groove cast around its perimeter which mates with the contour milled edge of the body casting. This provides a tight fit and the necessary light trap.

Diecast aluminum parts for camera—main body casting, lens mount and side panel

DeJur Spectator Turret, 8-mm movie camera



1. Embryo for Buick's rear axle housings, this coil strip is 1008 commercial quality steel. It's 0.180 in. thick, 17 in. wide. This 1500-ton Clearing press blanks out 36 housing-halves a minute, two per stroke



3. A Danly 1000-ton press, set on 12 strokes a minute, moves the parts from left to right. The die bends the banjo flanges in stages of 90, 135 and 180 degrees. It also balls four corners and puts a lengthwise vee in the blank

2. Stacks of blanked halves, 60 deep, move from the conveyor onto this ball transfer. A hydraulic hoist lifts the stacks into load position for automatic transfer die

# Axle Housings Roll

ENGINEERS, production men, in fact everybody at Buick Division, GM, are quick to point out that all the changes in their car for '56 can't all be seen by the pedestrian.

Buick spent some 90 per cent more this year in model changes than it did in '54.

The biggest alterations don't show up until you get the car on a hoist. Aside from the highly touted change in the transmission, the biggest single revision is the completely redesigned rear axle.

High spot of Buick's new facilities is the line that forms and welds housings for these axles. It's a wedding of standard forming and welding with automatic cycling and transfer. It gives production men a practical combination of hand and automation techniques.

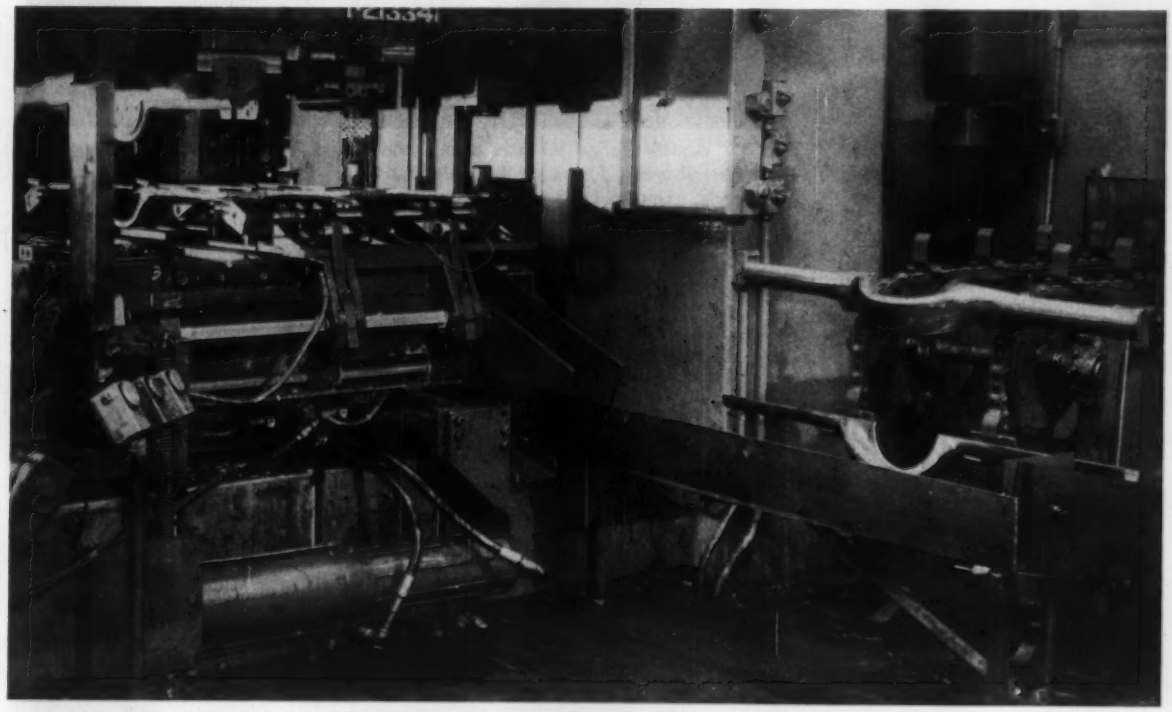
**Line-Up**—The first press turns coiled strip into blanks at the rate of 36 a minute. Ejected parts are stacked on a roller conveyor. The stacks, 60 parts deep, glide down the conveyor to the next press.

Here, they're moved across a ball transfer and are power-hoisted for loading.

**Wash and Punch**—As they come out of this press, the parts are picked up on hooks and hauled through a Centri-Spray unit for washing and drying.

They than hang on a conveyor that takes them to a small Toledo 13 press. A 0.359-in. vent hole is punched in every other half housing.

**Welding**—Housing halves next go to a battery of



4. Parts coming out of the Danly jog 18 in. to the center of this 2000-ton Cleveland press. It's synchronized with the Danly at 12 strokes a minute—forms a half housing, including the banjo, restrikes and coins edges for welding and trims parts to length

five seam welders. The operator hand loads two halves into the fixture and presses them tight.

Flux on the machines is screened and recirculated. Another bank of four automatic welders presses the flanges tight against the housing ends and applies a fillet weld. The part is rotated 15 to 20 degrees beyond 360, to assure adequate overlap. A cutter on the machine automatically scrapes the first part of the weld to prepare for the lap.

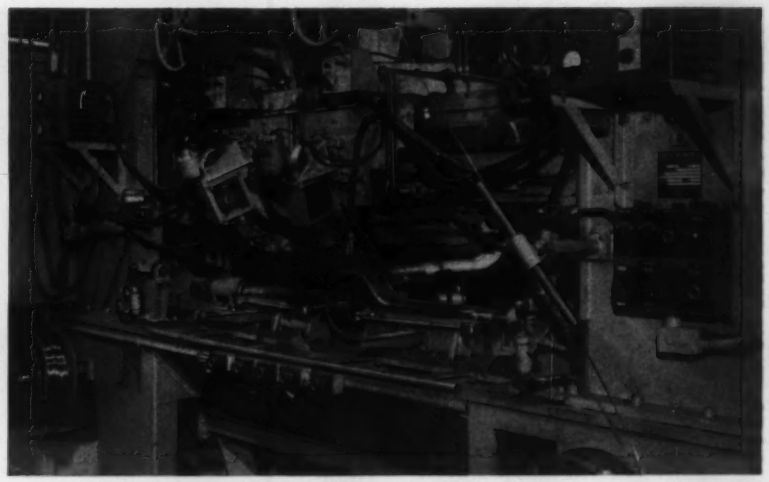
Generators, regulators, etc., for the welders are on air-conditioned balcony overhead.

**Cleanup**—Just prior to flange welding, housings go through two small presses. The first shaves eight spots on the seam welds, two on each end and two on each side of the banjo housing. This is cleanup for the flange weld and for welding covers on the banjo.

Parts then slide down a chute to a Warco 1000-ton press where they are coined and sized at each end. The banjo section is sized and the sides made flat and parallel.

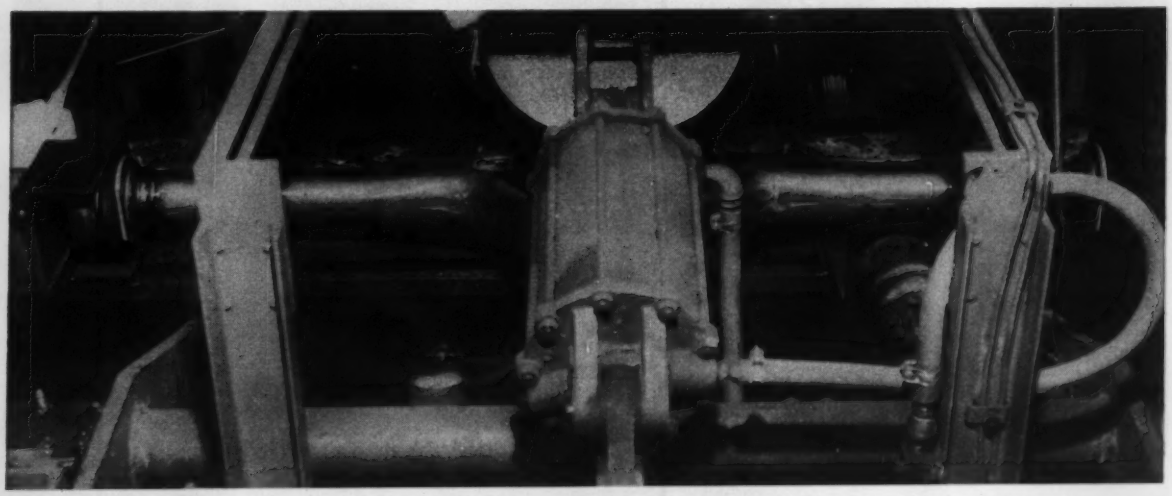
Another part of the housing line is a self-contained setup for turning out the end flanges. It's done on a Verson Transmat with a 30-a-minute cycle. (See STEEL, Jan. 30, p. 90).

**Formed Splines** — Axle shafts for this year's Buick have rolled splines. A battery of Michigan Roto-Flows rolls 200 splines an hour.



5. Automatic Expert welders clamp two halves together, lower and start four Lincoln submerged-arc heads. Seams are welded at 55 ipm. The first ¼-in. nearest the banjo is specified 100 per cent penetration. The remainder: 60 per cent

6. Agnew flange welders clamp and rotate housings with end flanges in place. The first 1½-in. of the weld is scraped flush to permit overlap at end of cycle. Lincoln LAF3 heads apply the fillet weld



7. Finished axle housings are sealed and filled with 6 lb of air pressure. The operator dunks them in this water tank to check for leaks. He also makes any necessary weld repairs

# 1/3 OFF

## NO BARGAIN
### FOR UNIFORM FLAT SPRING
## *PERFORMANCE*

According to the deflection formula for flat springs, the deflection or load of flat springs will vary in direct proportion to the third power of the thickness.

This means that flat springs made from .010″ ordinary commercial flat rolled high carbon strip (standard gauge tolerance ± .001″) can be off as much as 33%, plus or minus, in deflection or load value.

Where the nature of the service calls for more uniform spring performance, CMP produces restricted thickness tolerances which make possible load tolerances of ± 10% or less. CMP is regularly supplying such uniform restricted tolerances for special flat spring applications, multiple-station progressive die forming and other specialized end products where uniform, extra-close gauge accuracy reduces fabricating costs and waste and provides better product performance.

If you have a flat spring problem, you are invited to avail yourself of CMP's specialized knowledge and experience in this field.

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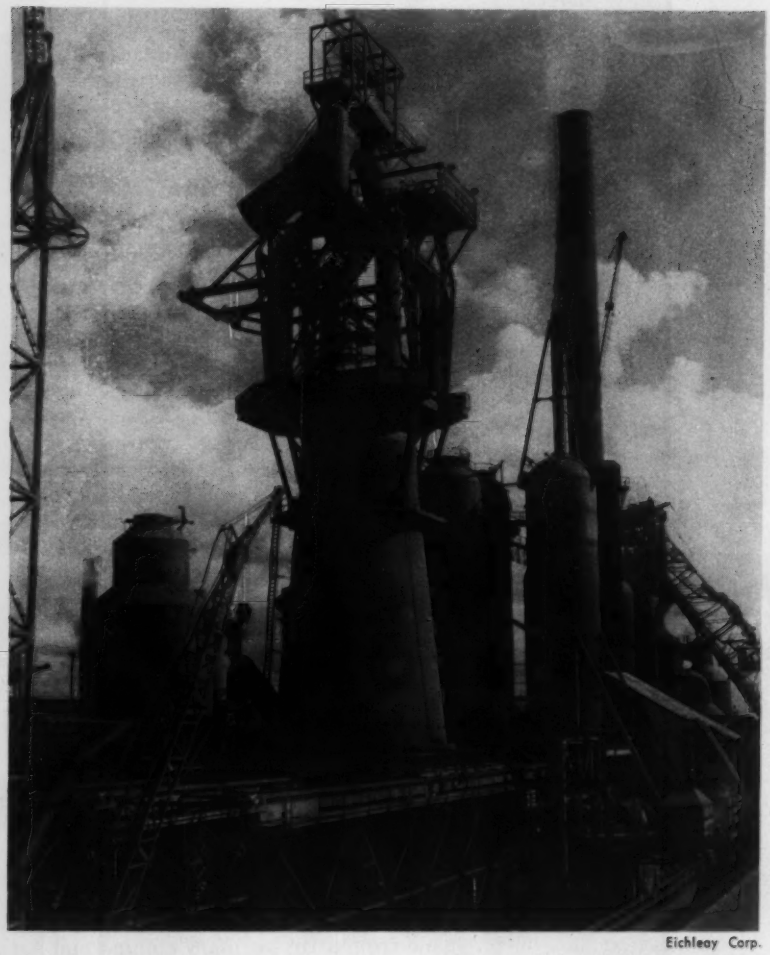


Eichleay Corp.

*Build a new stack on a trestle, then move it to base to . . .*

# Up Capacity in Less Down Time

IN 1948, when the above photo was made, it was moving day for a blast furnace stack at Youngstown Sheet & Tube Co.'s Indiana Harbor, Ind. Works. The moving technique will be used this year to save three to four months down time in enlarging the "A" blast furnace at Granite City Steel Co., Granite City, Ill.

The Freyn Department of Koppers Co. Inc.'s Engineering and Construction Division will build a substantial part of the new furnace on a steel platform 38 ft high while the "A" furnace is still operating.

When the old furnace is blown out and torn down, it will be the task of Eichleay Corp., Pittsburgh, to move the 605-ton, 171-ft-high structure and lower it onto permanent columns at the site of the demolished furnace.

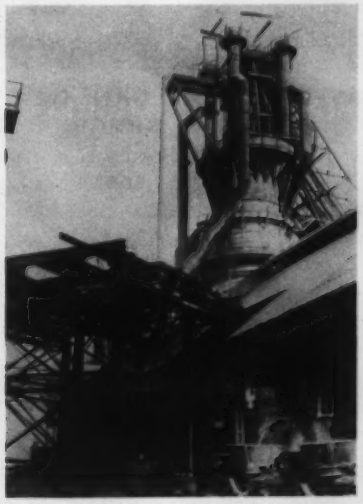
**Two Jobs**—The part to be moved includes the steel shell of the furnace and some sections of the filling and gas removal apparatus that rest on the lip ring at the top of the shell. Moving day will be sometime in April.

The thick, steel slabs, beam and plates of the columns and base, the hearth where the molten iron and slag collect and the bosh between the hearth and bottom of the shell will be constructed in place. About 725,000 bricks will be needed to line the inside of the shell—after it's in place—and for other parts of the furnace. The new furnace will be blown in about July 1.

Two furnaces are in operation at Granite City: The "A," which has a capacity of 199,500 tons a year, and the "B," which has a capacity of 250,500 tons.

**Adds to Capacity**—Koppers will build a new furnace on Eichleay's trestle, 85 ft from the "A" furnace, which has a hearth diameter of 17 ft 9 in.

Construction of the new furnace



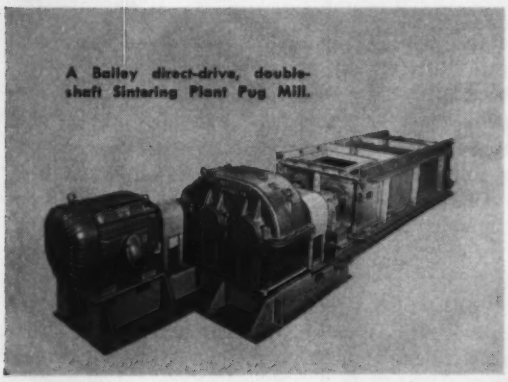
This Granite City Steel Co. blast furnace (shown in background) is to be replaced with a new furnace with double the pig iron capacity. To keep lost production time to a minimum, most of the new furnace will be fabricated on the 38 ft-high steel platform shown above while the old furnace is still operating.

SINTERING PLANT

# Bailey PUG MILLS

THIS MILL—BUILT IN 1930 IS STILL IN OPERATION

This was the first Bailey Pug Mill, installed in 1930. It still operates efficiently today, and even the original bearings still are in service.



A Bailey direct-drive, double-shaft Sintering Plant Pug Mill.

These mills are built for continuous service and for the low-cost processing of greater tonnages of more uniform sintered products. Bailey Pug Mills have capacities ranging from 100 to 400 tons per hour. They are made in single and double shaft models, with direct or rope drives. *Write for bulletin.*

| REPRESENTATIVE BAILEY PUG MILLS USERS | Number of Mills |
|---|---|
| Bethlehem Steel Company | 5 |
| Jones & Laughlin Steel Corporation | 2 |
| United States Steel Corporation | 13 |
| Youngstown Sheet & Tube Company | 3 |

WILLIAM M. Bailey COMPANY

ENGINEERS

LEADERSHIP THROUGH QUALITY

1221 BANKSVILLE ROAD PITTSBURGH 16, PA

began last December. Work to tear down the old stack will start in March. When the new furnace is completed, its capacity will be 1200 tons a day. This will nearly double the furnace's capacity.

**Larger Furnace**—The new stack will have a hearth diameter of 26 ft, 6 in., lined down to 25 ft. The widest part of the steel shell will be 39 ft in diameter at the bottom. It will taper to 17.6 ft at the top. The stack will be 82 ft high. Over-all height of the entire furnace will be 210 ft.

Nooter Corp., St. Louis, is erecting the cylindrical steel shell ordered by Koppers. It will require 2500 tons of 1 to 1¼-in. carbon steel plate.

The foundation of the old furnace will be used for the new one, after several modifications are made. Koppers will also demolish four hot blast stoves in the "A" furnace, replacing them with three larger, higher efficiency units. Other auxiliary equipment to be built: Gas cleaning equipment, valves, electrical precipitator and skip and bell hoists.

**Cuts Down Time**—With demand for pig iron heavy, Granite City chose this novel way of trimming iron-to-iron down time about 50 per cent (from seven or eight months to four). Normally, the furnace would be torn down and a new one erected at the same spot.

This new furnace is a major part of an expansion program which will increase Granite City Steel's ingot capacity about 30 per cent by early 1958. It will help round out other production facilities which were supplemented by the company's recently completed $89-million expansion program.

**Experience**—Building an offsite blast furnace while tearing down the old stack has been done rarely. Although it's a proved method for saving time, crowded blast furnace sites at most plants make it impossible even in boom years.

Eichleay has moved three stacks this way. In 1942, it moved an offsite blast furnace for Youngstown Sheet & Tube Co. at its Campbell Works. Three years after the Youngstown job, it moved a blast furnace for Colorado Fuel & Iron Corp., at Pueblo, Colo.

Engraving a large steel roll at Modern Engraving & Machine Co. The small wheel at the top of the roll impresses the pattern

# Embossing Quality Forged In

THREE-DIMENSIONAL patterns of great variety have long been impressed in sheet metals and other materials to decorate them and to change their texture, stiffness, rigidity or strength. Progress in this art has resulted largely from better embossing rolls.

This depends on the availability of forged steel rolls having sound, uniform metal, particularly at the surface, which responds uniformly to the production of an impressed pattern under a rolling die, and case hardens uniformly when subjected to precision flame hardening.

**Forged Rolls** — Using precision methods, Modern Engraving & Machine Co., Hillside, N. J., produces mating engraved steel rolls. Forged and machined rolls ready for engraving are supplied by the Standard Steel Works Division of Baldwin-Lima-Hamilton Corp. in sizes ranging up to 20 in. in diameter and 6 ft long. Rolls up to 12 ft long are supplied in smaller diameters.

Production of mating rolls means that the most complicated design is matched, cleared and crowned to emboss on one or both sides. Fractured and distorted engravings have been virtually eliminated by new engraving techniques.

**Hardening**—Scale, soft spots and distortions are prevented by a new machine method of flame hardening under automatic control.

The roll is rotated around a vertical axis while a concentric ring of oxyacetylene flames, followed by quenching water jets, ride from end to end of the engraved rolls. The rate is regulated electronically by reflected heat. The result is an engraved surface case hardened with great uniformity.

NEW! **Heavy-duty relay in small space**

This new CLARK Type "PM" Control Relay introduces a new concept in relay design: *Sectional Pole Construction.*

In this new relay, each pole is contained in its own melamine housing, and any individual pole can be removed or replaced from the front without disturbing the others. A short circuit is confined to a single pole and will not destroy the whole relay. Wiring terminals are on the front, and all maintenance including coil changing, pole or magnet replacement, is also from the front—without removing relay from panel. Contacts are quickly and easily convertible from normally open to normally closed and vice versa—from the front. Range of models provides relays with 2 to 12 poles. Exclusive design allows more contacts per square foot of panel space. In addition to the many advantages of SECTIONAL POLE CONSTRUCTION, you get a *heavy-duty relay in small space.*

*For complete information write to*

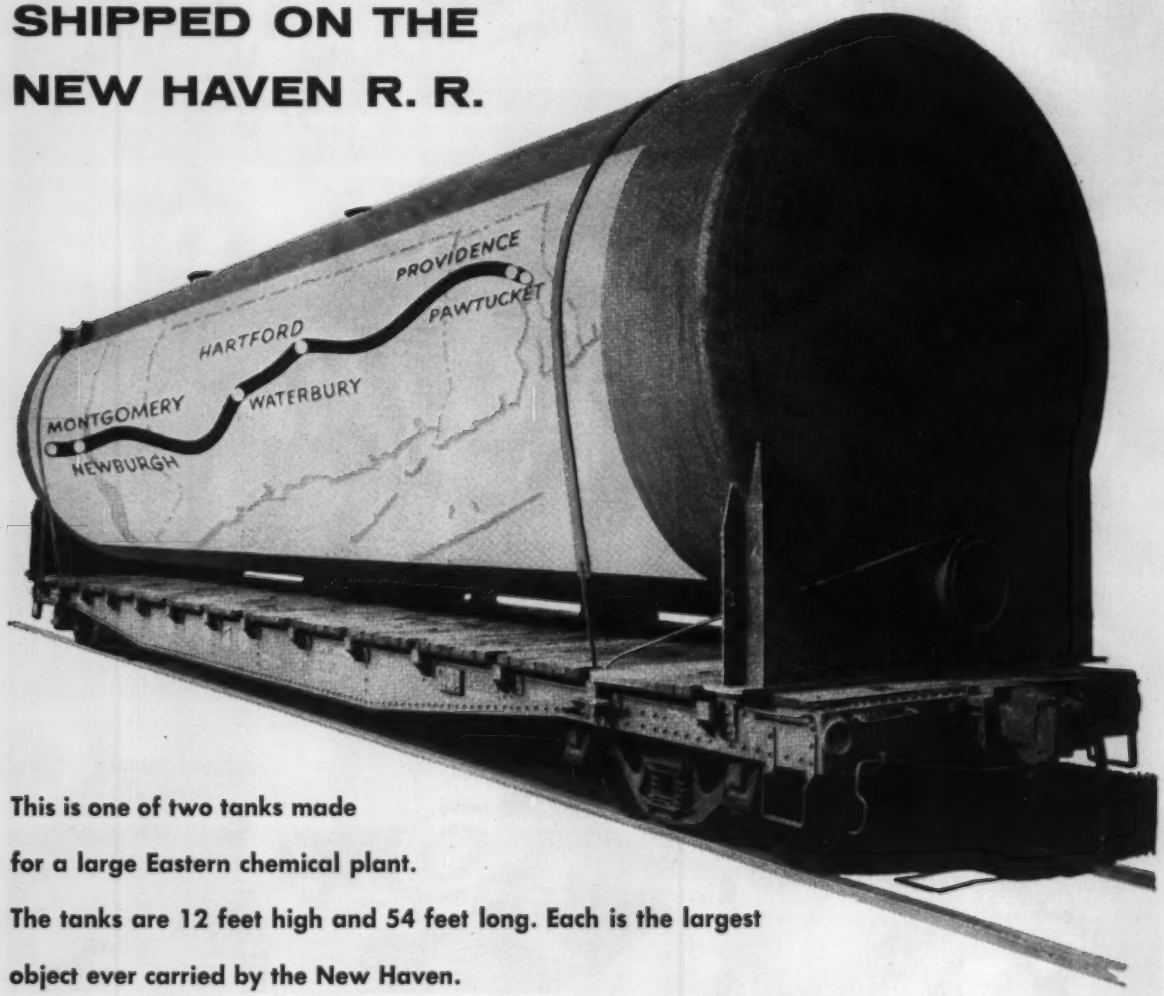
*The* CLARK CONTROLLER *Company*

*Engineered Electrical Control*

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA . . . CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

# BIGGEST THING EVER SHIPPED ON THE NEW HAVEN R. R.




**This is one of two tanks made for a large Eastern chemical plant. The tanks are 12 feet high and 54 feet long. Each is the largest object ever carried by the New Haven.**

The acid storage requirements of this modern plant called for these two specially designed tanks—and U.S. Permobond® lining was chosen to properly protect them. But the immense size of the tanks set up a problem: the bridges, tunnels and overpasses on the railroad made normal routing out of the question.

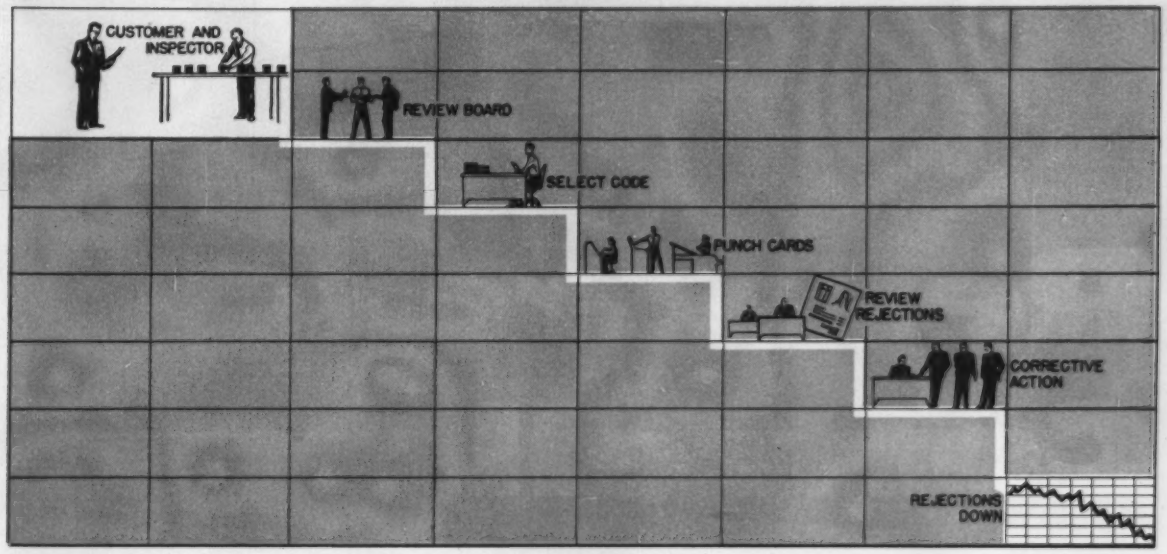
Working with the railroad's traffic department, "U.S." arranged a special routing for the tanks—from the steel fabricating plant to the "U.S." plant in Providence (where the tanks were lined) and then to the site of the chemical plant. The map on the side of the tank (above) shows the route from fabricating plant to Providence.

For protection against corrosion of tanks, piping, valves—get in touch with "U.S." technicians through Mechanical Goods Division, United States Rubber, Rockefeller Center, New York 20, New York.

US RUBBER

Mechanical Goods Division

**United States Rubber**




*Beech Aircraft's system proves it's profitable to . . .*

# Use Your Customers' Complaints

UP-TO-DATE control programs leave room for the customer to have his say.

How you use customer complaints is what counts. Many still handle them one at a time, referring only the most drastic to production and quality control for corrective action.

A better way is to send complaints—all of them—through a punched card tabulating system and include the results in the final evaluation of how good your quality is.

Beech Aircraft gets two-way results. Inplant quality is double-checked by the complaints; corrective action satisfies the customer and eliminates the cause of the trouble.

**Problems**—There are two types of quality problems—those rejections or variations found during the manufacturing process and the dislikes and irritations of the customer. Exactly how you tie-in production quality with customer complaints is a matter of opinion.

Ford uses a punched card system to record dealer and customer complaints. It likes to keep production rejects and outside complaints separate. Each type is weighed with a sliding scale of values. Beech Aircraft feels that all complaints should be put into the same pot and handled as one.

**Ford Systems**—The number and dollar value of customer complaints are determined by the service and accounting departments. Management uses this information in charts and graphs, noting trends and predicting future quality.

The Dealer Delivery Condition Report is a parallel system. Every fifth car produced has a coded card folded over its sunvisor. Stamped and self-addressed, it has space for the dealer's remarks. After he receives the car and services it, the dealer merely circles the code that represents any discrepancy, adds a few remarks and drops the card in the mail.

These reports are sent through a punched-card system. Statisticians tie these results and customers' complaints to several other quality reporting systems. It's complicated, but it gets results.

**Beech** — This system gets emphatic support from the top. Its corrective action committee (representatives are from quality control, production, engineering and tooling) sees that offending parts are given the third degree. Reviews made at the end of four-to-eight weeks have always shown that the method is effective.

In 2½ years, some of its paper work dropped as much as 75 per cent. More important, inspection labor was cut 40 per cent. Customer complaints dropped, radically at first, then leveled off at about 25 per cent reduction. Several excellent punched card and tabulating systems are available. Some can be rented.

**Do It Yourself**—Look over your quality control system. Is there too much paper work? Is paper work being used to give accurate monthly or semiannual reports of quality trends?

"No cost conscious, customer-satisfying industry today can afford to be without such a [customer acceptance] program," says K. L. Jones of Beech Aircraft.

Tie in your plant quality with the customers' complaints and the payoff will surprise you.

# Research-Cottrell Precipitator

- Open Hearths
- Iron Ore Sintering Machines
- Ferro-Manganese Blast Furnaces
- Scarfing Machines

Take a look inside the horizontal flow precipitator on the next page. This is the type of Cottrell used for cleaning gases coming from open hearths, iron ore sintering machines, ferro-manganese blast furnaces, as well as scarfing machines and electric furnaces.

Although it differs in design from the Research-Cottrell blast furnace precipitator, this Cottrell has the same basic advantages: handles any volume of gas at any collection efficiency up to almost 100%. Maintenance and power costs are low, draft loss is only a few tenths of an inch of water, and the precipitator is designed and constructed for many years of heavy-duty, all-weather service.

In addition to these major advantages, a few more design features are shown in the cutaway drawing on the next page.

**1** Rapping puffs prevented by automatic and continuous cleaning of collecting electrodes with Magnetic Impulse Rapper (patents pending).

**2** Plumb-bob discharge electrodes are individually weighted and positioned by a steadying frame for maximum efficiency.

**3** Hopper baffle prevents gas sneakage around electrodes.

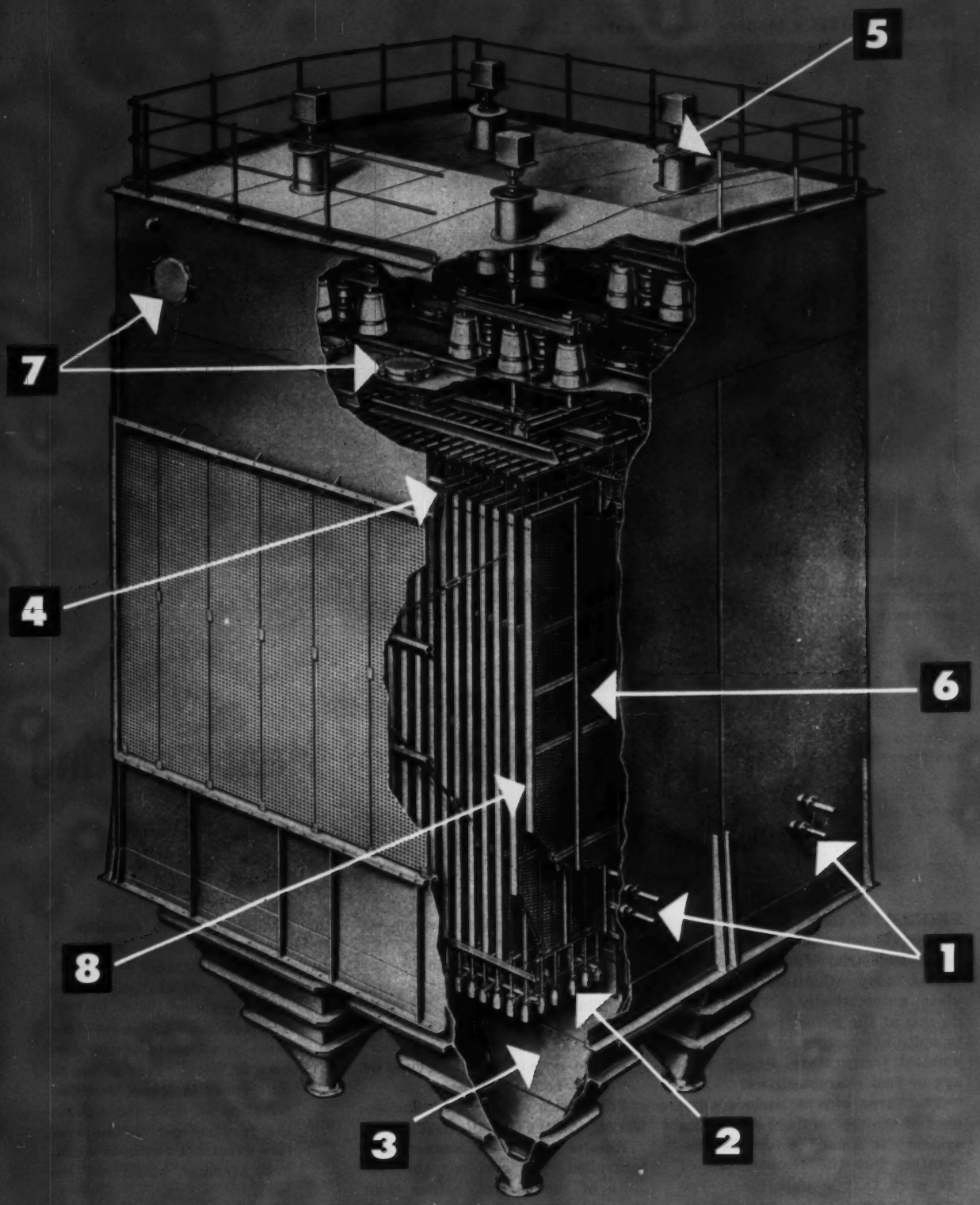
**4** Hook-type collecting electrode hangers, quickly installed, insure uniform distribution of rapper vibration throughout entire collecting surface.

**5** Continuous, automatic discharge electrode rapping insures optimum performance.

**6** No moving parts in gas stream—minimizes maintenance.

**7** Easy access to high tension equipment.

**8** End and intermediate baffles provide quiescent zones and prevent re-entrainment of collected dust.




# Research-Cottrell, Inc.

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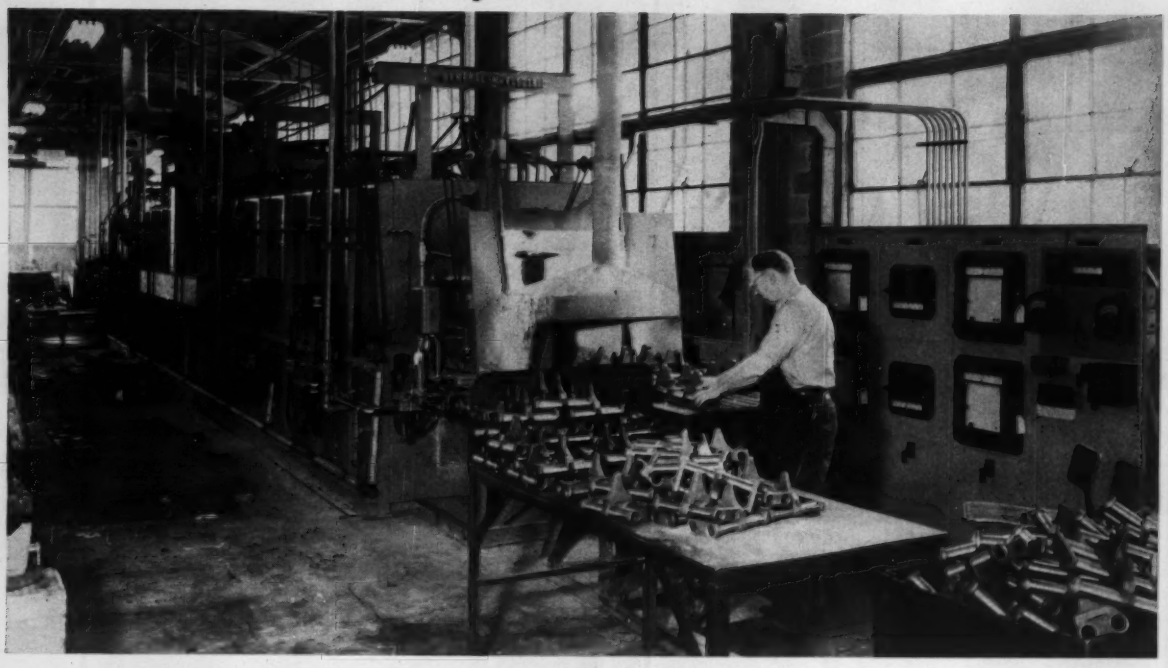


A typical annealing furnace with remote temperature indicators, controls and recorders on the panel at the right. These endless track links are annealed automatically and discharged at the far left

# Temperature Control of Heat Treating

By R. M. SILLS
General Electric Co.
Schenectady, N. Y.

REGULATE the temperature of the work being heated — that's what industrial furnace control means today. Controls must regulate automatically. They must do this at the lowest possible cost, in spite of changes in production, ambient temperature, supply voltage or fuel characteristics.

The furnace is a basic component of the temperature regulating system. It is not the furnace temperature but the temperature of the work that is important. The work temperature is controlled, directly or indirectly, by regulating furnace temperature, and the characteristics of the furnace are simply a link in the chain of such a system.

Temperature control systems include these parts:

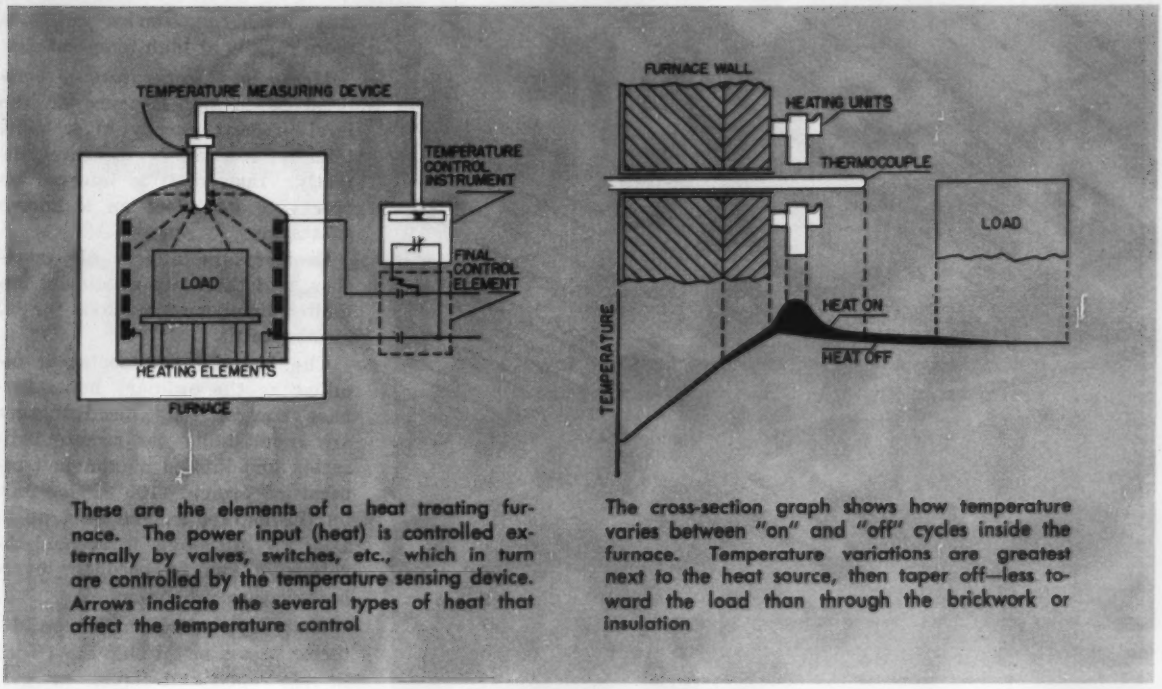
1. The furnace, or heating equipment.
2. The sensing device or primary element.
3. The instrument or controller.
4. The power control device, or final control element.

This series will consider the selection and use of the last three.

**Results Count**—In measuring a controlled temperature, the results of the control, rather than the absolute temperature itself, are more important. The correct operating temperature is determined by trial, by the results of the heat treatment. It doesn't matter what absolute temperature the measuring device indicates.

Absolute temperature is elusive anyway. To illustrate:

1. In most furnaces, temperature is not constant.
2. Temperature is never the same in all parts of the furnace or work. This is due to differences in losses and distribution of heat throughout the furnace and to temperature gradients (without which heat transfer would not occur).
3. The temperature measuring device measures the temperature at one point in the furnace, and indicates its own temperature at that, rather than the work temperature.




These are the elements of a heat treating furnace. The power input (heat) is controlled externally by valves, switches, etc., which in turn are controlled by the temperature sensing device. Arrows indicate the several types of heat that affect the temperature control

The cross-section graph shows how temperature varies between "on" and "off" cycles inside the furnace. Temperature variations are greatest next to the heat source, then taper off—less toward the load than through the brickwork or insulation

# Furnaces

Because furnace temperature continually changes, the temperature measuring device continually absorbs or loses heat. The accuracy with which it follows the changes depends upon its speed of response.

**Tailored Response**—While small mass and fast response are desirable, their importance is sometimes overemphasized. In general, all that matters is that the measuring device responds a little more rapidly than the work being heated.

For example, a fast measuring device should be used when heating thin steel strip; a sluggish one is satisfactory for a load of heavy castings or tightly wound coils.

## DEFINITIONS

| | |
|---|---|
| 1. Ambient: | Surrounding |
| 2. Capacitance: | Change in stored energy required to produce unit change in temperature, expressed as Btu per degree |
| 3. Circuit: | One of several areas within a zone controlled through a separate valve, contactor, transformer, etc. |
| 4. Control Point: | The average temperature at which the furnace is to operate |
| 5. Deviation: | The difference between the actual temperature and the set point |
| 6. Differential Gap: | Applying to a two-position, final control element, it is the temperature change needed to move the control from one position to the other, as from "on" to "off" |
| 7. Offset: | Load error or droop. (A sustained difference between the set point and control point resulting from a predetermined relation between temperature and power input) |
| 8. Proportional Band: | The temperature change required to vary power input from minimum to maximum, usually expressed in per cent of controller scale range |
| 9. Resistance: | Temperature difference required to produce unit flow of heat, expressed in degrees per Btu per minute |
| 10. Set Point: | The temperature which the control attempts to maintain |
| 11. Zone: | The area of a furnace regulated by one control |

## Is Absolute Temperature Important?

In furnaces, knowing the absolute temperature isn't important. Above heating units are part of a radiant heating oven. Temperature is measured by a thermocouple clamped to one of the sheath-type heating units. The temperature of the heating units is 1500° F, the thermocouple about 1300°F and the material 425°F.

This is an extreme case of temperature gradients. Since the temperature measuring device is usually located in the temperature gradient, it will measure a temperature somewhere between that of the heat source and the work.

These are typical gradients in an electric furnace. Although gradients make it difficult to measure true furnace or work temperatures, they are frequently a considerable aid to temperature control. Here the work temperature changes less than the controlled or measured temperature, and considerably less than heating unit temperature.

Another reason is that at temperatures around 1400°F and above, most of the heat transfer is by radiation. The temperature measuring device may see several temperatures that influence temperature indication. The effect of each surface on the indicated temperature will depend on its area, temperature, emittance and distance from the measuring device.

The thermocouple temperature is less than the sheath temperature because heat is radiated by the clamp and conducted away by the couple. This does not impair the effectiveness of the thermocouple or control.

Any measuring device responds more rapidly at high temperatures.

**Measuring Temperature** — Temperature is the measure of the level of heat energy in a body. Usually, it can't be measured directly. Instead, it is inferred by observing its effect on a known substance.

Temperature affects all materials, and there are an almost unlimited number of methods for its measurement.

The bi-metal thermostat is familiar as the ordinary home furnace control. Its disadvantages are unsuitability for remote indication and limited maximum temperature, around 1100°F. One unit on the market can be used up to 1800°F. Although it is nonindicating, it can be used for over-temperature protection.

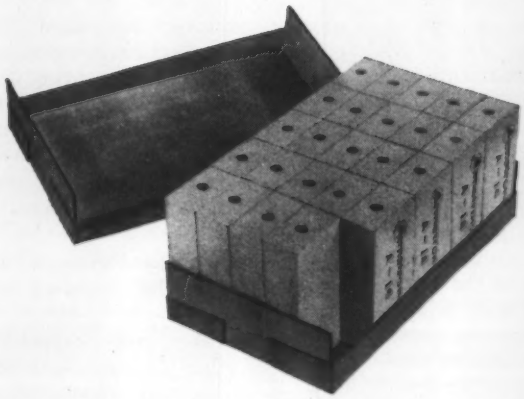
**Bulb Type**—The bulb-type detector uses a metal bulb filled with liquid, vapor and liquid, or gas, connected to the operating mechanism through a thin capillary tube. The expansion of the fill, transmitted through the capillary tube, operates a bellows, diaphragm or helix, which in turn operates the control mechanism and sometimes an indicating or recording device. Depending on the fill, bulbs may be operated from −300 to +1200°F.

Bulb-type detectors are inexpensive, reasonably accurate, and are common for such control applications as cooling water. Chiefly because of the capillary tubing, top temperatures are limited. Bulbs are not used to any great extent for furnace temperature control.

**Temperature Sensitive** — The many advantages of temperature sensitive resistors are certain to receive increasing attention, particularly for the higher temperature ranges.

These devices consist of a small coil of copper, nickel or platinum wire wound on an insulating form and enclosed by a protecting tube. The resistance change of these materials is uniform and predictable with changes in temperature. Properly used, they are among the most accurate available, are particularly good for low temperatures or for measuring small temperature

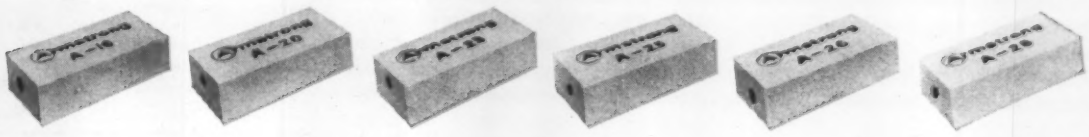
# Packaging . . . tray and sleeve carton cuts on-the-job handling time of Armstrong Insulating Fire Brick



This unique tray-type package takes less time to open than conventional cartons . . . makes twenty-five brick immediately accessible. With Armstrong's easy-to-open package, a bricklayer can save enough time to lay up an extra carton of brick a day. A carload of Armstrong Insulating Fire Brick, laid up at that speed, would save about $350 in labor costs.

**For a free booklet** giving complete details on the entire line of Armstrong Insulating Refractories, write Armstrong Cork Company, 2702 Reed Ave., Lancaster, Pa. If you have a furnace lining or building problem, call in your Armstrong sales engineer for expert help.

## Armstrong INSULATING REFRACTORIES



differences. They are usually limited to a maximum temperature of about 1000°F, although special units have been built for lab use up to 2000°F.

Their chief disadvantage in industrial furnace work is that most of the materials used are adversely affected by the common reducing atmospheres.

**Radiation Detectors** — Small thermocouples, connected in series, with their hot junctions close together, are the heart of radiation detectors. Radiant energy is focused on the hot junctions by a mirror or lens. Radiation detectors are used for temperatures above those permitted for standard thermocouples or other devices or to measure the temperature of a moving object, such as steel strip.

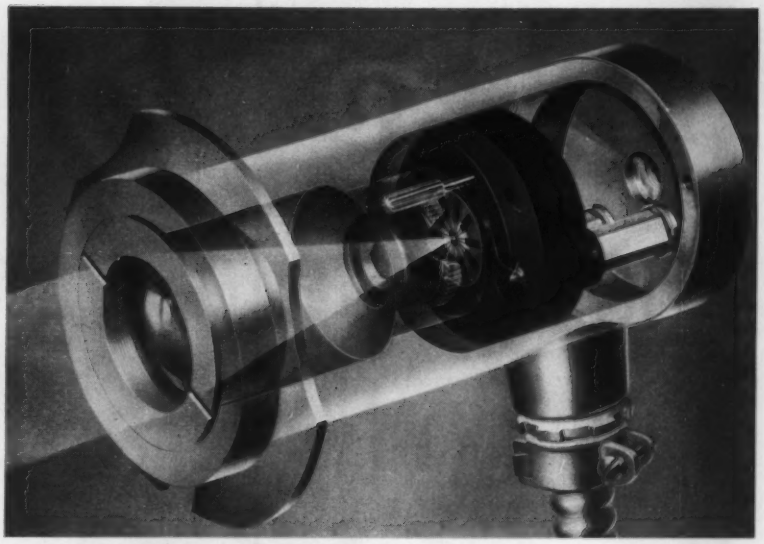
The detector's ordinary range is 800 to 3300°F, but it may be used as low as 125°F or as high as 6000°F. The low temperatures require a special control for the reference junction and are difficult to calibrate in terms of absolute temperature.

The fact that radiation detectors are nonlinear limits the practical temperature span and usable range. They should only be used in the upper half of their calibrated range.

Metal or ceramic tubes, either open or closed end, protect radiation detectors. Open-end tubes may have to be calibrated for emittance from the hot body. For this reason, such instruments are usually furnished with calibrating rheostats.

**Radiation** — Temperature measurements cannot be taken at face value. Radiant energy given off by a hot surface is a function of the surface temperature and surface emittance. These characteristics vary from one material to another, even for the same material at different temperatures.

Consider the problem of measuring the load temperature in a closed furnace. If the load temperature is constant, the radiant energy absorbed must equal that which it emits. If the load is opaque, all the radiant energy falling on it must be absorbed and subsequently emitted, or reflected.



A radiation detector can't tell the difference between radiant and reflected heat. Even so, the radiation detector (like this one) is the best for furnaces that operate at 2700° F or more

A radiation detector cannot differentiate between radiated heat and reflected heat. If the work is at the same temperature as the furnace walls, it will exhibit black body characteristics, and the temperature reading obtained from it will be accurate. For the same reason, an accurate measure of furnace wall temperature may be obtained, provided the volume of work is small compared with the volume of the furnace.

Suppose the load temperature is lower than the furnace walls. The radiant heat reflected by the work represents a hotter temperature than the work itself, so that the temperature reading will be higher than the temperature of the work. Similarly, if the hot body is surrounded by a temperature lower than its own, the measured temperature will be lower. The error can be calculated if the furnace wall temperature and emittance of the hot object are known. In practice this is difficult to do with a high degree of accuracy.

For furnaces operated above 2700°F, the radiation detector is about the only commercially satisfactory device. It is best for a moving object or an object which cannot be touched. For this reason, it is sometimes used to measure the temperature of work heated by induction.

For the induction application, radiation detectors are available which require an extremely small viewing area and which respond rapidly (98 per cent in 1 second).

**Damping Need** — In measuring and controlling the temperature of moving objects which are not continuous, consideration must be given to the effect of the discontinuity. Unless the measuring device is purposely made slow (damped), there will be a dip in its temperature indication each time there is a discontinuity, and this may cause unwanted control action.

Among their disadvantages, in addition to the difficulties of interpretation, radiation detectors are considerably more expensive than most other temperature measuring devices. They are subject to calibration errors due to fogging, changes of emittance and the effects of gases, smoke and flames.

Thermocouples will be discussed in the next part of this series.

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• *Extra copies of this or the six articles in this series on temperature controls are available in quantities of one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

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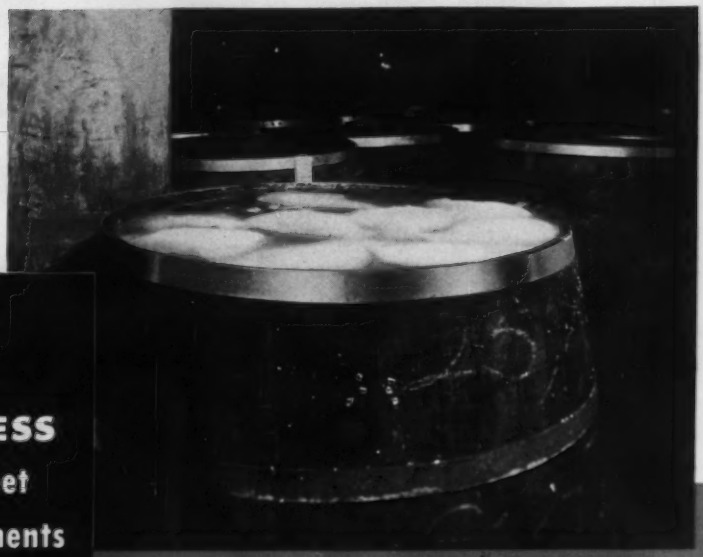
# Sure Cure for Hams



Photo, courtesy Keokuk Barrel Company, Keokuk, Iowa

## How Stainless Steel from the HOUSE OF STAINLESS Helps Curing Casks Meet Food Inspection Requirements

**THE PROBLEM . . .** In supplying the meat packing industry with large ham curing casks, the Keokuk Barrel Company was confronted with the problem of corrosion contamination caused by the action of the curing solution on the head hoop of the cask. The objections raised by the food inspectors aggravated the seriousness of the situation.

**THE SOLUTION . . .** The CSS sales-engineer serving Keokuk Barrel went into this problem with the company's engineers and showed them the right stainless that would not only resist the curing solution, but also provide the structural strength required for the head hoop. Once this stainless was supplied for the hoops and stainless rivets furnished for joining, the problem was eliminated.

The ability of the House of Stainless to diagnose customers' problems and then follow through with delivery from our comprehensive warehouse stocks or direct shipments through our mill placement department makes this the logical source for all your stainless steel requirements.

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## CHICAGO STEEL SERVICE COMPANY

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Mailing Address: P. O. Box 6308, Chicago 80, Illinois
Milwaukee District Office: 757 North Broadway, Milwaukee 2, Wisc., Telephone BRoadway 3-7874

**Sales Representatives at:** Bloomington and Rockford, Illinois; Indianapolis and South Bend, Indiana; Cedar Rapids and Davenport, Iowa; Grand Rapids, Michigan; Minneapolis, Minnesota; Appleton, Wisconsin.

# Reduces Pipe Handling Time by 83%

## *Savings Pay for Tramrail System in One Year*

▲ The Tramrail transfer crane travels in the middle bay and connects as desired with the spur tracks over the side bays, thus enables the hoist carrier reaching every part of the room. Incoming pipe is lifted from railroad cars with a Cleveland Tramrail hoist carrier operating on a track serving the floor above and lowered through the hatchway at one end of this warehouse.

◀ Outgoing pipe is brought directly from storage to trucks. The hoist and entire system is rated at one ton.

SEVERAL hundred tons of ⅛ to 16 inch diameter pipe are received at the Pipe Warehouse of Palmer Supply Co., Seattle, Washington, per month. To handle this by hand was such a loathsome chore that it was difficult to keep men at this work, and the labor turnover was large.

The installation of a Cleveland Tramrail track and transfer crane system took over the fatiguing job of lifting, as well as hauling, of the pipe into and out of the warehouse. It made possible the handling of large, heavy bundles per trip in less time than required for one or a very few pipes by manual handling. It thereby reduced the man-hours required for pipe handling to approximately one-sixth. Resulting dollar savings paid for the system in one year.

Cleveland Tramrail equipment offers you so much and pays off in so many ways for such a long time that we urge you to study its possibilities in your plant.

*GET THIS BOOK!*
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

**CLEVELAND TRAMRAIL DIVISION**
THE CLEVELAND CRANE & ENGINEERING CO.
7807 East 290th Street, Wickliffe, Ohio

**CLEVELAND TRAMRAIL**
**OVERHEAD MATERIALS HANDLING EQUIPMENT**

## Vacuum Furnace Gives Temperatures up to 2500° F

Metallic and ceramic parts can be heated in a vacuum of 200 to 300 microns in this unit for research and small production lots.

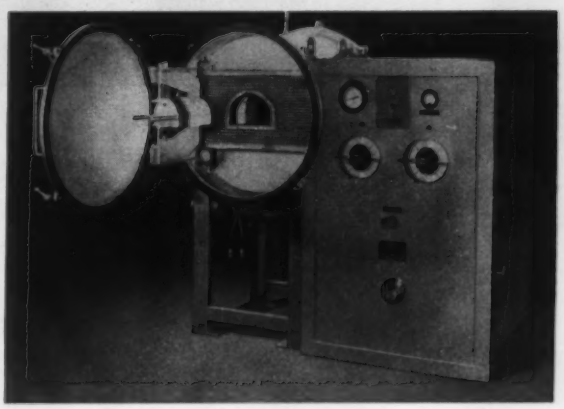
It has a D-shaped muffle with a chamber which is 13 x 7½ x 5 in. Resistance heating elements are placed around the muffle.

A high vacuum is obtained in a few minutes.

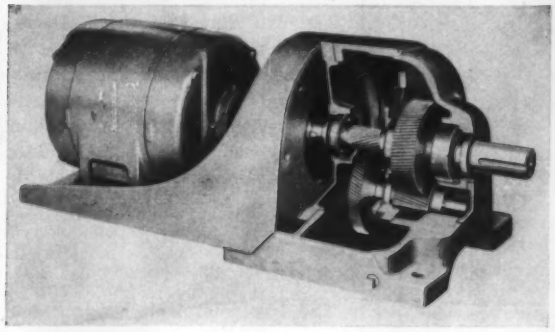
Furnace, pumping equipment and electric controls are assembled compactly.

The furnace has easy access though a removable end bell and a hinged plug refractory door.

Other furnaces are larger and can be modified for lower and higher temperatures. *Write*: Harper Electric Furnace Corp., 39 River St., Buffalo 2, N. Y. *Phone*: Mohawk 5366



## Geared Motors Meet Heavy Shock Loads



More horsepower per pound is delivered by a new line of geared motors built to the new NEMA sizes.

The double reduction units have ratios from 6.2 to 1 through 38.4 to 1. They transmit up to 60 hp.

Triple reduction units have ratios from 47.1 to 1 through 292 to 1 and transmit up to 20 hp.

A cast housing gives protection under severe abuse.

Drives operate quietly, a result of precision machining and the use of rugged cast iron housings.

A straddle-mounted pinion withstands shock, reversing, and heavy loads. Draining of oil is unnecessary. *Write*: Dept. PR, Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill. *Phone*: Randolph 6-7790

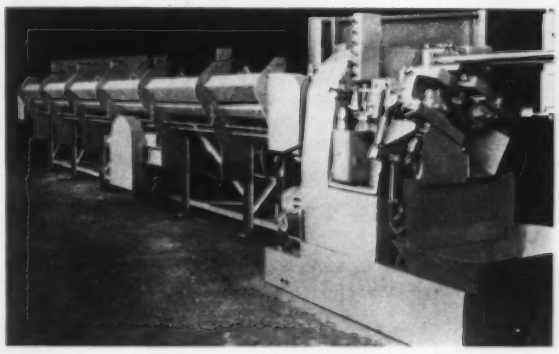
## Bar Feeder Handles Random Lengths of Stock

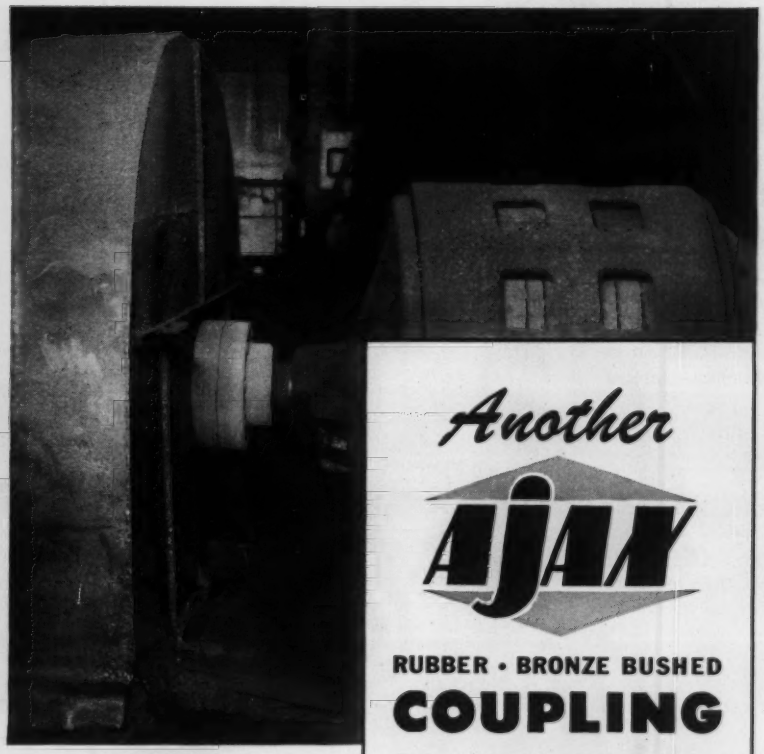
This device feeds an entire stock load to a cutoff machine automatically. Remnants of each bar or tube are ejected, and the end of the new bar is trimmed and chamfered.

A hopper is used to hold lighter wall tubing (about 100 pieces of 2¾-in. OD tubes). An inclined table is used for bar stock or heavy tubes.

The feeder may be equipped with both the hopper and table when both tubing and bars are cut.

Turning a crank adjusts for different diameters. Feeders are available for any maximum length bars. Simplified models handle stock of one diameter. *Write*: Modern Machine Tool Co., 2005 Losey Ave., Jackson, Mich. *Phone*: State 4-7134





Another

AJAX

RUBBER • BRONZE BUSHED

COUPLING

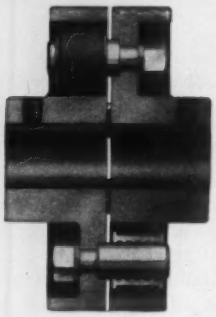
*Running for 30 Years Without One Cent for Maintenance (Nobody Even Wiped the Dirt off)*

This Ajax Rubber-Bronze Bushed Coupling has been operating continuously in heavy duty steel mill service without attention for years and years and years.

When you remember that all the horsepower goes through the coupling, the importance of safeguarding direct-connected machines against misalignment is obvious.

Ajax Flexible Couplings are quiet running and require no lubrication. There is no objectionable backlash. Elimination of shut-downs of machines and entire departments is far more important than their low first cost.

Ajax engineers have specialized on flexible couplings for 35 years. It will pay you to put your drive problems up to Ajax.



**HOW THEY WORK**

● Since it is impossible to mount two shafts, each in its own bearings so that they will rotate around the same axis, it is imperative that the couplings which surround these shafts permit each shaft to rotate around its own axis without creating vibration, backlash, strain or wear, reversal of torque, and all other detrimental factors that enter into direct connection of power. Misalignment between shafts of driving and driven machines is a serious overload factor contributing to rapid bearing wear. This is intensified by today's demand for high operating standards, increased loads, and space limitations.

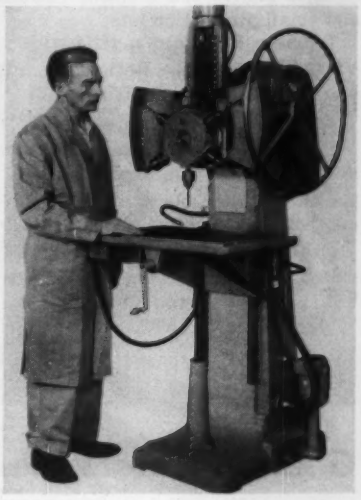
**AJAX FLEXIBLE COUPLING CO. INC.**
**Westfield, N. Y.**
*Representatives in Principal Cities*


## NEW PRODUCTS and equipment

### Turret Drill

Any combination of six operations can be done in one setup by this new drill.

It drills holes up to ⅜-in. in steel, has a 7-in. stroke and a speed range of 325 to 4050 rpm.



The drill has fast power indexing, a sensitive feed and preselected speeds and stops. The elimination of quick-change tools increases accuracy and saves time. *Write*: Burg Tool Mfg. Co. Inc., Gardena, Calif. *Phone*: Davis 9-4158

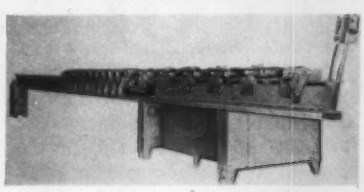
### Bar Bender

The bar joist web bending machine will take a 30-ft rod and bend any size web section in less than a minute.

The machine eliminates shearing and handling of short stock for just a few bends and the painstaking fitting of short web sections into a jig.

Faulty and excessive welds are minimized with a continuous web that provides proper welding clearance at upper and lower cords.

Web sections from 8 to 20 in.



**Anaconda** 15-kv cable is subjected to 106 kv — 33% above industry standards with d-c. And tested at 25% above industry requirements with a-c.

## 15-KV CABLE GOES

# Skin diving at 106 kv

**Anaconda Type AB butyl-insulated high-voltage cable is tested under water at 600% overvoltage to assure you peak performance.**

The fact that two high-voltage cables may look alike does not mean they'll perform alike. At Anaconda, 15-kv cable is tested at 106 kv with d-c for fifteen minutes. This voltage is *33% above industry standards with d-c.* And in addition, Type AB is tested at *25% above industry requirements with a-c.*

Only a vastly superior insulation can stand such high test voltage, even though there is no defect in the cable.

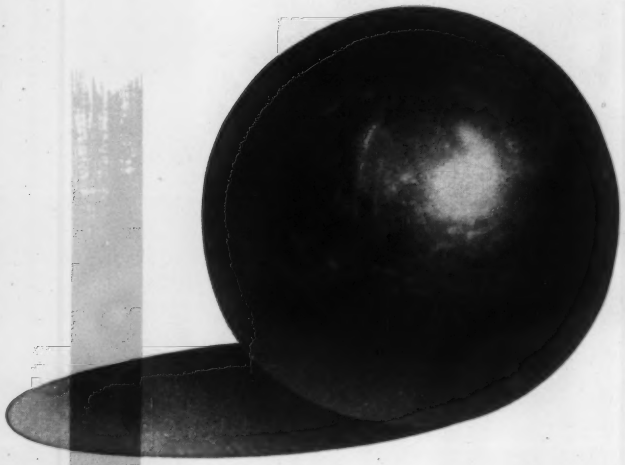
For your assurance of maximum service, Anaconda butyl-insulated cables are designed to perform far beyond industry requirements — in every important electrical and physical property.

**New Engineering Bulletin EB-27** gives you full details on performance of Type AB insulation in 15 Industry Specification tests. Ask the Man from Anaconda for your copy. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 56294

**Get all the facts on Anaconda Butyl. Write today —**

**SEE THE MAN FROM ANACONDA®**

pioneer in **BUTYL INSULATION**



A HEAD START
IN STEEL SHOT
QUALITY

Pioneered in 1948, and backed by over 60 years' experience in the manufacture of abrasives, Tru-Steel Shot was the original High-Carbon Fully Heat-Treated Steel Shot of Tool Steel Quality!

Tru-Steel, and only Tru-Steel, has the head start in experience, in manufacturing know-how, in years of solving steel shot blasting problems!

Every heat of Tru-Steel is laboratory tested and controlled to the exacting standards of fine steel making!

Only in Tru-Steel are found the combined characteristics that have been sought for years in metal abrasives — super toughness for resistance to breakage and proper hardness for fast, thorough surface-bright cleaning.

And Tru-Steel is now packaged in 50-lb. double burlap bags — the finest packaging ever devised for metal abrasives — lighter, easier to handle, easier to stack, not slippery like slick, hard-surfaced cardboard cartons.

NOW IN 50 POUND BAG

THERE'S ONLY ONE
TRU-STEEL
Manufactured by
STEEL SHOT PRODUCERS, Inc.
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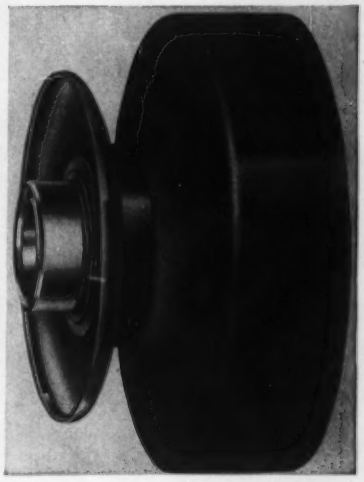
Sold and recommended by
Pangborn Corporation, Hagerstown, Md.

## NEW PRODUCTS and equipment

in depth can be made with the desired pitch. Production rates: 6000 bends an hour with ⅜-in. rods 30 ft long; 1500 bends an hour with ¾-in. stock. *Write*: Eidal Mfg. Co. Inc., Box 1299, Albuquerque, N. Mex. *Phone*: 2-5223

### Automatic Clutch

This clutch is for 1/6, 1/4 and 1/3-hp electric motors. It's recommended for original equipment on air conditioners, furnace blowers, automatic washers, sweepers, dryers, power tools and vacuum pumps.



The clutch is easy to install and gives improved product performance. It reduces the length of sustained in-rush current by permitting the motor to reach full speed before any load is applied.

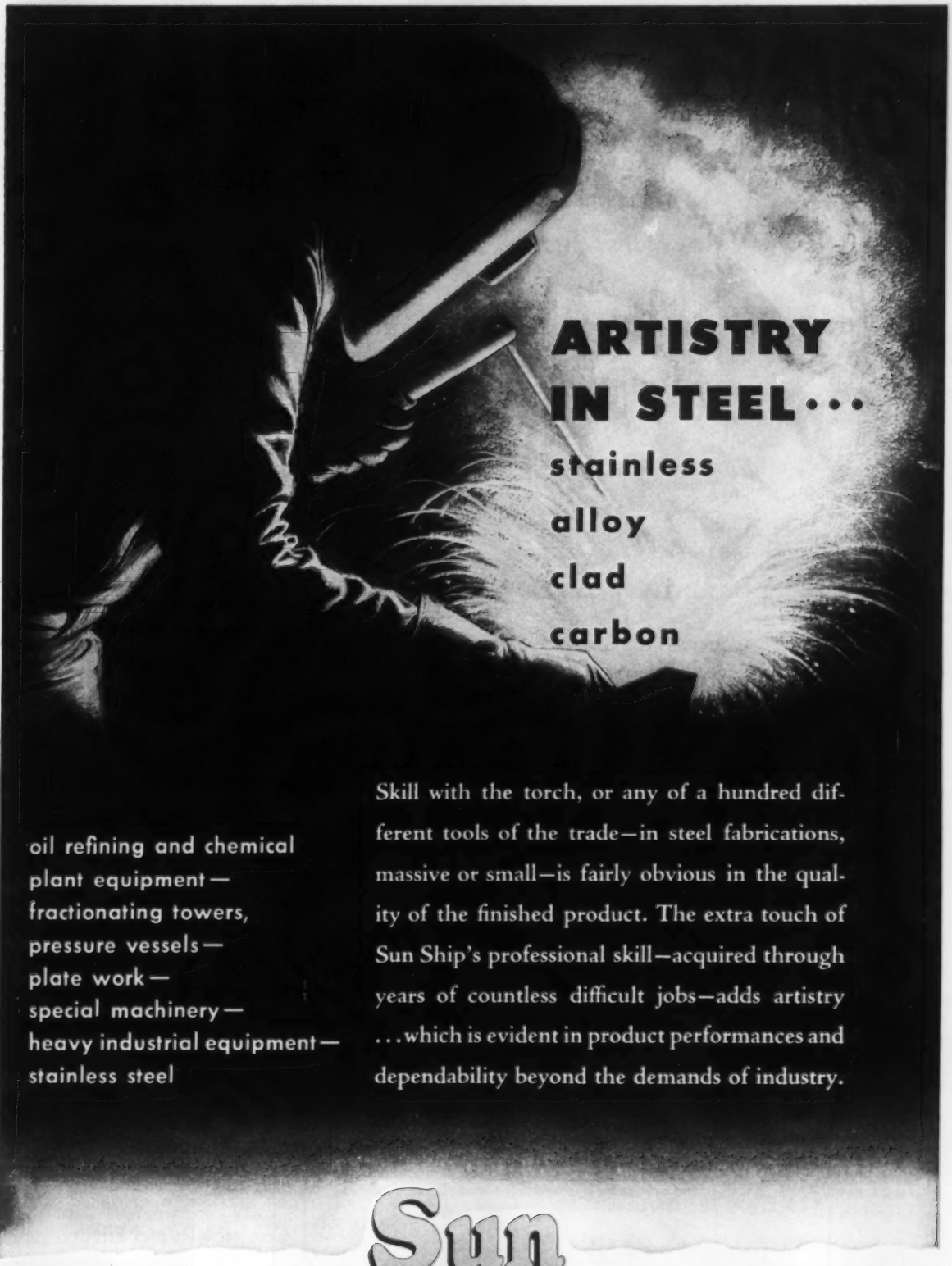
It assures smooth acceleration, transmits full power without slippage and is effective in handling high inertia loads.

The clutch has only one moving element. *Write*: Mercury Clutch Division, Automatic Steel Products Inc., Canton, O. *Phone*: Glendale 6-3453

### Bearings

Longer bearing life is brought to spherical roller bearings with an OD of 9.4488-in. and larger by equipping them with lubricating holes in the outer ring.

The lubricant, flowing from the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Skill with the torch, or any of a hundred different tools of the trade—in steel fabrications, massive or small—is fairly obvious in the quality of the finished product. The extra touch of Sun Ship's professional skill—acquired through years of countless difficult jobs—adds artistry ...which is evident in product performances and dependability beyond the demands of industry.
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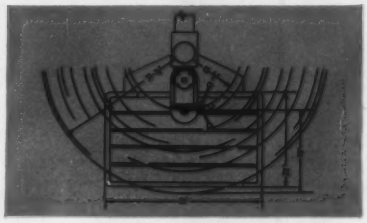
COMPARE — You'll see that you get a lot more for your money when you buy W-T "Light-Heavyweights"!

## Big, cumbersome jobs are duck soup to this adaptable Radial Drill Press!

This is your drill press for big, bulky jobs, where it's faster and easier to move the drill head than the work. This Walker-Turner Radial Drill gives you really *big* under-the-drill capacity — you can drill to the center of a 62″ circle, or locate the drill anywhere on sheet stock up to five feet wide. Perfect for sheet stock of all kinds, plywood, switchboard panels.



**1600 Series — "Light-Heavyweight" Radial Drill Press** — Ram travel, 18″; spindle travel, 4″ (special models available with 6″ spindle travel). Six-spline, full floating spindle. Spindle speeds from 110 to 8300 rpm. Capacity to ½″ in cast iron. Drill head and motor assembly tilt to 45°, right or left.

Your Walker-Turner Distributor will demonstrate the unusual versatility of this Radial Drill. He's listed under "Tools" in your phone book's Yellow Pages. Or write for his name, and full specifications.

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RADIAL DRILLS — WOOD AND METAL CUTTING BAND SAWS — TILTING ARBOR SAWS
RADIAL SAWS — JIG SAWS — CUT-OFF SAWS — LATHES — SPINDLE SHAPERS
JOINTERS — BELT AND DISC SURFACERS — FLEXIBLE SHAFT MACHINES

walker-turner

**WALKER-TURNER**
Division
Kearney and Trecker Corporation • Plainfield, N. J.


## NEW PRODUCTS and equipment

middle of the bearing toward the outside (instead of from the sides toward the center), flushes out the old lubricant, and with it, any abrasive dust, dirt, moisture or other impurities.

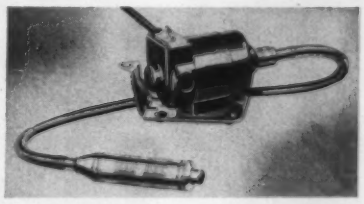
The new flow-path prevents the entry of dirt into the bearing and makes it easier for the lubricant to reach all working surfaces. *Write*: SKF Industries Inc., Philadelphia 32, Pa. *Phone*: Garfield 6-6400

### Flexible Shaft

Here is a high speed tool for bench finishing, deburring, tool and die grinding and sharpening.

A ¼-hp motor develops 22,000 rpm and has the power to maintain a sustained torque under load—an ideal condition for carbide burr use.

The sheath has three layers—armored wire casing, wire braid and a neoprene cover. It operates smoothly even when bent to a 6 in. radius.



A bronze liner around the spun wire shaft acts as a bearing to confine rotation. The liner also lubricates the shaft.

A threaded adaptor spun to the sheath locks both to the handpiece. The adaptor prevents kinking and entangling of the sheath.

The handpiece takes ⅛ and ¼-in. shank-mounted wheels, points and carbide burrs up to ⅜-in. in diameter. *Write*: Dunmore Co., Racine, Wis. *Phone*: Melrose 3-8221

### Coolant Pump Filter

A filter and purifier removes chips and grindings from all coolants.

A powerful magnetic tube is suspended under the pump intake in the coolant tank. The floating met-

al particles are trapped by the magnet and held to the tube instead of being pumped back into the cooling system.

Metal particles up to 1-in. thick can accumulate around the tube's circumference. The accumulation is removed by pushing a neoprene wiper along the ring.

Aluminum, brass or stainless steel tubes can be built to fit any tank. *Write*: Magnetool Division, Multifinish Mfg. Co., Detroit, Mich. *Phone*: Kenwood 5-0190

## Fork Truck

Here's a truck for fast handling of loads in confined areas. A short wheelbase and 360-degree steering permit maneuvering in narrow aisles and inside truck trailers and boxcars.

A device on the steering mechanism prevents steering wheel kickback.

The new model has a 3000-lb capacity at 24 in. on a 68-in.-high model and 3000-lb capacity at 20 in. on the 83-in. truck.

Other features: Worm drive, packaged unit assemblies, contractor controls and a caster-type trail axle. *Write*: Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O. *Phone*: Utah 1-6200

## Enclosed Motors

Two lines of alternating-current motors, the standard enclosed and the severe-duty enclosed, replace a single line of 1-to-5 hp motors.

Both lines have longer Permanumbered leads for use with time-saving wire nuts. Each foot-

DURALOY
DURASPUN

HIGH ALLOY CASTINGS FOR HIGH TEMPERATURE SERVICE

1700°f

*Here's an Annealing Retort for 1700° F Service 35% Ni—15% Cr 30" Diameter 30' Long*

Duraloy is the place to come for high alloy castings—for high temperature service, for highly corrosive service. Castings to your specifications are a Duraloy specialty.

We are equipped to do large and small work. We can turn out single static castings of 7 tons or more and single centrifugal castings up to about 4½ tons. On your next high alloy casting job, check with Duraloy!

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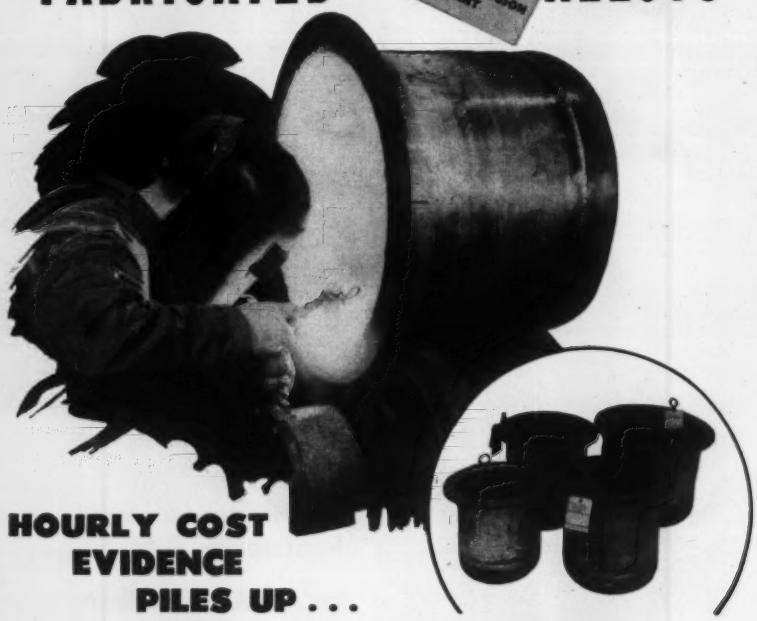
# ROLOCK

## FABRICATED ALLOYS

HEAT AND CORROSION RESISTANT



**HOURLY COST EVIDENCE PILES UP . . .**

*it pays WELL to switch to* **NEU-POTS**

**ROLOCK'S WELDED-FABRICATED NEUTRAL SALT POTS**

Occasional good "case histories" are fine . . . but here we have practically ALL the people who now use NEU-POTS reporting *many* times previous service life. For example:

A screw manufacturer. Operating temperature, 1550° to 1600°, 16 hours per day. Idling temperature, 1350° to 1400°, 8 hours per day. NEU-POT service, *5616 hours* . . . cost, less than 6¢ per hour.

A heat treating and brazing shop. Operating temperature, 1500° to 1550°. NEU-POT service, *3300 hours* with "no end in sight." Cost to date, 13¢ per hour.

A stamping manufacturer. Previous *average* life of pots, 165 hours at a cost of over 54¢ per hour. NEU-POT life on same job, already *over 1000 hours* at average hourly cost of 34½¢.

There are, of course, some very good reasons for such success with NEU-POTS. Rolock methods and skills in welded fabrication of high heat-resistant alloys develop the full advantages of this type of construction, while solving previous tough problems such as joint leakage. Special X-ray inspection procedures on each individual pot before shipment furnish a positive extra safeguard.

Because some neutral salt pot users are hard to convince . . . till they make their own tests . . . we give special attention to *first* orders. Why not send yours in today?

SALES AND SERVICE REPRESENTATIVES FROM COAST TO COAST

ROLOCK INC., 1262 KINGS HIGHWAY, FAIRFIELD, CONN.

**JOB-ENGINEERED** for better work
Easier Operation, Lower Cost

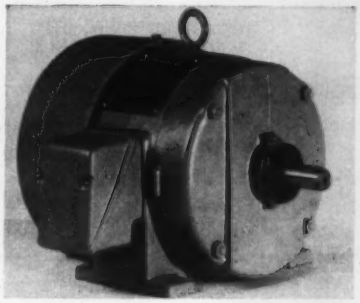
2RL56


## NEW PRODUCTS and equipment

mounted motor is equipped with a lifting eye.

The standard motor has a steel conduit box and fan cover. The keyhole mounting of the conduit box makes for quick and easy installation.

All threaded parts on the severe-duty motors are coated with a special lubricant that has prevented threads from seizing after five years of use.

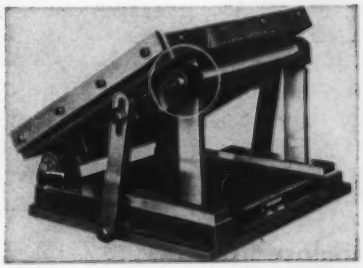


Neoprene-sealed washers on the through bolts and a new-type shaft seal give additional moisture protection.

A stainless steel hardware kit is available for the most severe chemical conditions. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: 4-2211

### Sine Plate

This 12-in. square sine plate has the rigidity needed for heavy angular milling, boring and drilling and the accuracy needed for inspection work.



Two swivel blocks are at the ends of the sine bar rolls. The gage blocks which set the sine plate to the desired angle are placed between swivel blocks and gaging pads in the base plate.

The weight of the workpiece and

## P-K® ASSEMBLY ENGINEERS ARE TRAINED TO HELP YOU DESIGN BETTER PRODUCT FASTENINGS AT LOWER COST

There's a Parker-Kalon Assembly Engineer nearby—ready to work for you. He's a fastener specialist with the experience and skill to help with your particular problem. Perhaps, he can show you how to eliminate some fasteners from your design—or suggest the use of less expensive types of fasteners. That's part of his job. Take advantage of this unique service while your product is still in the design stage. Call your local Parker-Kalon distributor and have him send a P-K assembly engineer to your office. This service is another reason why industry finds... if it's P-K, it's O.K.!

*Sold Everywhere Through Leading Industrial Distributors. Warehouses in Chicago, Illinois, Los Angeles, California*

**PARKER-KALON® *fasteners***

PARKER-KALON DIVISION • GENERAL AMERICAN TRANSPORTATION CORPORATION • CLIFTON, NEW JERSEY

*Before you hang up,*

*your order for alloy steel bars, billets and forgings, in whatever size, shape and treatment you need, is well on its way to being filled.*

All seven of our modern warehouses are located in principal industrial areas... near you. Each one is well-stocked: equipped to fill your alloy steel requirements promptly, whether you need standard AISI, SAE or our own special HY-TEN steels—"the standard steels of tomorrow". Every warehouse, too, is staffed with experts in metallurgy who are ready to serve you.

Write today for your FREE copies of Wheelock, Lovejoy Data Sheets. They contain complete technical information on grades, applications, physical properties, tests, heat treating, etc.

*near you . . .*

*Warehouse Service* – Cambridge • Cleveland • Chicago
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**WHEELOCK, LOVEJOY & COMPANY, INC.**

**131 Sidney Street, Cambridge 39, Massachusetts**


## NEW PRODUCTS and equipment

top plate is distributed evenly over the gage block surfaces. Conventional sine bar rolls have single line contact.

Any compound angle can be set quickly by using two sine plates together.

The two sine plates will remain in position; bolt holes in the base plates assure secure attachment of one unit on the other.

The nonmagnetic top plate has tapped holes and T-slots for clamping work. The top and base plate are ground flat and parallel to toolroom accuracy.

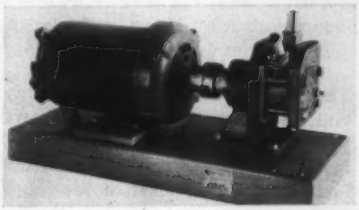
The top plate is set up on 10-in. roll centers. Closed height is 5 in.

The maximum angle setting is 60 degrees; angular accuracy is ±10 seconds. *Write*: Omer E. Robbins Co., 24800 Plymouth Rd., Detroit 39, Mich. *Phone*: Kenwood 3-7902

### Stainless Steel Pumps

Corrosive solutions, abrasive slurries and fluids which must be kept free from contamination are handled by a new line of pumps.

Stuffing boxes and shaft seals are eliminated by a flexible liner made of synthetic rubber or plastic. A gentle pumping action permits the handling of sensitive emulsions and suspensions. Up to 265° F solutions can be pumped.



All pumps are self-priming; no gaskets or check valves are used. Capacities range from ⅓ to 20 gpm. The pumps are connected to either constant or variable speed motors. Variable flow rates can be obtained with variable speed drives.

Vacuums up to 26 in. of mercury are developed on the suction side of the pump. *Write*: Vanton Pump & Equipment Corp., 201 Sweetland Ave., Hillside, N. J. *Phone*: Waverly 6-2435

# time . . . measured by BRICK

The pulsing spring of the conductor's watch . . . the soaring radio tower of the Naval Observatory . . . the clock on your nightstand regulated by the 60-cycle current of your electricity . . . all owe their existence to brick.

It's refractory brick controlling the flames of industry, producing metals, glass, electricity that combine to measure and communicate time.

Refractories are the industry behind industry—*all* industry, for everything that's made or moved requires them. To provide them in the infinite variety that industry demands, General Refractories employs advanced scientific research, draws on the world for materials, and produces in plants strategically located to serve industry with a complete refractories service.

*The Industry Behind Industry*
GENERAL REFRACTORIES COMPANY
Philadelphia 2

**SEND FOR THE MOTION PICTURE: THE GREFCO STORY**

It is a beautiful 16 mm. motion picture in full color which relates the fascinating and little understood story about the refractories industry . . . *the industry behind industry*. Viewing time is 26 minutes. If you would like to show it to executive, employee, social, church or other groups, a request on your letter head is all that is necessary. Address General Refractories, Philadelphia 2.

GENERAL REFRACTORIES

# NEW literature

Write directly to the company for a copy

### Industrial Fans

Fans for handling air, granular material and long shavings are described and rated—bulletin 5306-H, 72 pages. American Blower Corp., Detroit 32, Mich.

### Heat Exchanger Alloys

Typical uses of nickel-copper alloys in power plants are presented in a 28-page bulletin. Reader Service Section, International Nickel Co. Inc., 67 Wall St., New York 5, N. Y.

### Brazing and Soldering

Automatic gas-fired brazing machines for production are covered in bulletin S-1050, 8 pages. Selas Corp. of America, Philadelphia 34, Pa.

### Clutch Controls

Control panels for high speed presses equipped with pneumatic clutch and brake are covered in a 2-page bulletin. Fawick Airflex Division, Fawick Corp., 9919 Clinton Rd., Cleveland 11, O.

### Honeycomb Materials

Information on shaping honeycomb materials electrolytically is given in bulletin 156, 6 pages. Anocut Engineering Co., 631 W. Washington St., Chicago 6, Ill.

### Stainless Steels

Architectural uses of stainless steels are presented in a 12-page bulletin. Sales Dept., Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

### Strainers and Air Eliminators

New models for use with liquid meters are described in bulletin OG-326, 8 pages. Meter & Valve Division, Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

### Crane Electrification

A conductor and collector system of the inverted-Y type for overhead crane and runway electrification is described in catalog 2021-A, 8 pages. Cleveland Crane & Engineering Co., Wickliffe, O.

### Gage Catalog

Engineering data and instructions for using plug, taper, ring, limit and thread gages are given in a 112-page catalog. Threadwell Tap & Die Co., Greenfield, Mass.

### Fire Protection

Fog, foam, carbon dioxide and dry chemical systems for protection of special hazard areas are discussed in a 28-page bulletin. "Automatic" Sprinkler Corp. of America, Youngstown, O.

### Hydraulic Systems

A trouble-shooting chart helps operators and maintenance men stop and cure common troubles. Industrial Products Department, Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa.

### Arc Welding

Technical data card 155A gives recommendations for welding steel tubing. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

### Nickel-Lined Pipe

Information on nickel-plated pipe which can be fabricated is given in an 8-page folder. Bart Mfg. Corp., 227 Main St., Belleville 9, N. J.

### Buffing Wheels

Cutting and coloring buffs are described in bulletin B-103, 12 pages. Hanson-Van Winkle-Munning Co., Matawan, N. J.

### Vertical Boring Machine

A machine for precision boring is depicted in a 4-page bulletin. Wadell Equipment Co., 119 South Ave., Garwood, N. J.

### Helical Gear Drives

Inline gear drives, both double and triple reduction, are described in bulletin 2651, 16 pages. Dept. PR, Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.

### Abrasive Blasting

A high carbon steel grit for blast cleaning is described—bulletin 901-D, 4 pages. Wheelabrator Corp., 321 S. Byrkit St., Mishawaka, Ind.

### Air Conditioning

Units for cooling crane cabs, pulpits and heat relief rooms are presented in bulletin 561, 20 pages. Larco Inc., Route 20 East, Painesville, O.

### Metal Finishing Systems

Metal cleaning units and paint drying ovens are featured in bulletin 51, 16 pages. Despatch Oven Co., 619 Eighth St. S.E., Minneapolis 14, Minn.

### Materials Handling

Case history report 31 describes the handling of malleable iron castings in a New England foundry. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O.

### Brass and Aluminum Nuts

Standard hexagon nuts, open and closed-end cap nuts and knurled thumb nuts are described—bulletin 55, 16 pages. Fischer Special Mfg. Co., 476 Morgan St., Cincinnati 6, O.

### Surface Plate Calibration

A kit using a granite straightedge (calibrated to 0.00001-in.) for checking surface plate accuracy is described in a 6-page bulletin. Rahn Granite Surface Plate Co., 641 N. Western Ave., Dayton 7, O.

### Rotary Embossing

A machine for metal embossing and some available patterns are illustrated in a 6-page bulletin. Modern Engraving & Machine Co., 1413 Chestnut Ave., Hillside 5, N. J.

### Dust and Fume Collectors

Floor and cone collectors are presented in a 6-page bulletin. Zack Co., 4600 W. 12th Place, Chicago 50, Ill.

## NEW BOOKS

*Machinist Dictionary,* Fred H. Colvin, Simmons-Boardman Publishing Co., 30 Church St., New York, N. Y. 496 pages, $7.50.

Information concerning machine terms, parts and standards is presented in a comprehensive form for quick and ready reference.

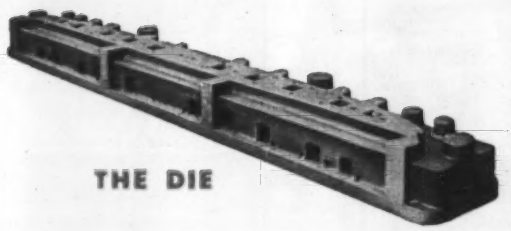
*Crane Handbook,* Advertising Department, Whiting Corp., Harvey, Ill. 176 pages, $10.

Practical data are presented on electric traveling cranes—operating speeds, clearances, design, safety, erection, maintenance, modernization of old cranes, etc.

*Foundations of Productivity Analysis,* Bela Gold, University of Pittsburgh Press, Pittsburgh 13, Pa. 303 pages, $5.

Here is a comprehensive appraisal of the sources, nature and effects of changes in productivity levels. Guides to the analysis and control of productivity adjustments are developed by combining technological, accounting and economic considerations into a unified framework for managerial control.

# AT NEMCO FOUNDRY: ANOTHER PROBLEM SOLVED BY CITIES SERVICE CORE OIL

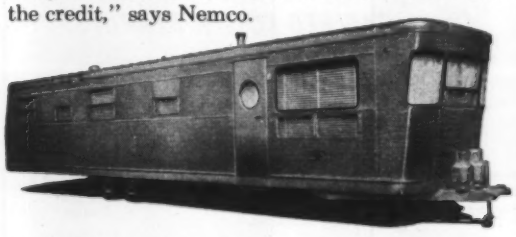


**THE DIE**

The die pictured here was cast at Nemco Foundry for use by the Spartan Aircraft Company in producing roof ribs for its Spartan Mobile Home. Difficult to produce, it required 10 cores 2⅝" x 2⅝" square and 25 cores, quarter-circle in shape, from ¾" to 1" in diameter. Semi-circular shape was necessary to core curved slots from top of die to sides. Holes had to be clean and free from obstruction, allowing stamped slugs to fall through. Nemco relied on Cities Service Delco Core Oil to help meet exact specifications. "A smart choice," says J. A. Dean, General Manager. "Delco Core Oil made the job far easier."

**THE ROOF RIBS**

The roof ribs of this Spartan trailer, cast from the die produced at Nemco, are visual proof of a job well done. "The great strength and high collapsibility of Cities Service Delco Core Oil share a lot of the credit," says Nemco.



**THE FINISHED PRODUCT**

The finished product is this handsome Spartan Mobile Home awaiting shipment to consumer. Spartan's rigid specifications help make it one of the safest and best on the market.

**Difficult casting of die to form roof ribs for Spartan Mobile Home made easier by Cities Service Delco #36**

Located in Tulsa, Oklahoma, Nemco Foundry enjoys attacking the really tough jobs and making them easier. And often helping to spearhead the attack is Cities Service, as described here by J. A. Dean, General Manager:

"Recently Cities Service Delco #36 Core Oil again solved a tough job for us in fulfilling the requirements for a casting for the Spartan Aircraft Company, makers of Spartan Mobile Homes. The casting was a bottom shoe for blanking die to make roof ribs for the all-aluminum shells for Spartan trailers.

"The die was of Nemcoloy, Type AL, an alloyed grey iron. It was 106" long, 8" thick and 13½" wide, and weighed 2,018 lbs. cleaned.

"It required 10 cores 2⅝" x 2⅝" square. In addition, it demanded 25 cores, quarter-circle in shape, ranging from ¾" to 1" in diameter. Semi-circular design was necessary in order to core curved slots from the top of the die to the sides of the die. Holes had to be clean and free of obstructions allowing the stamped slugs to fall through the die to the outside and not hang up.

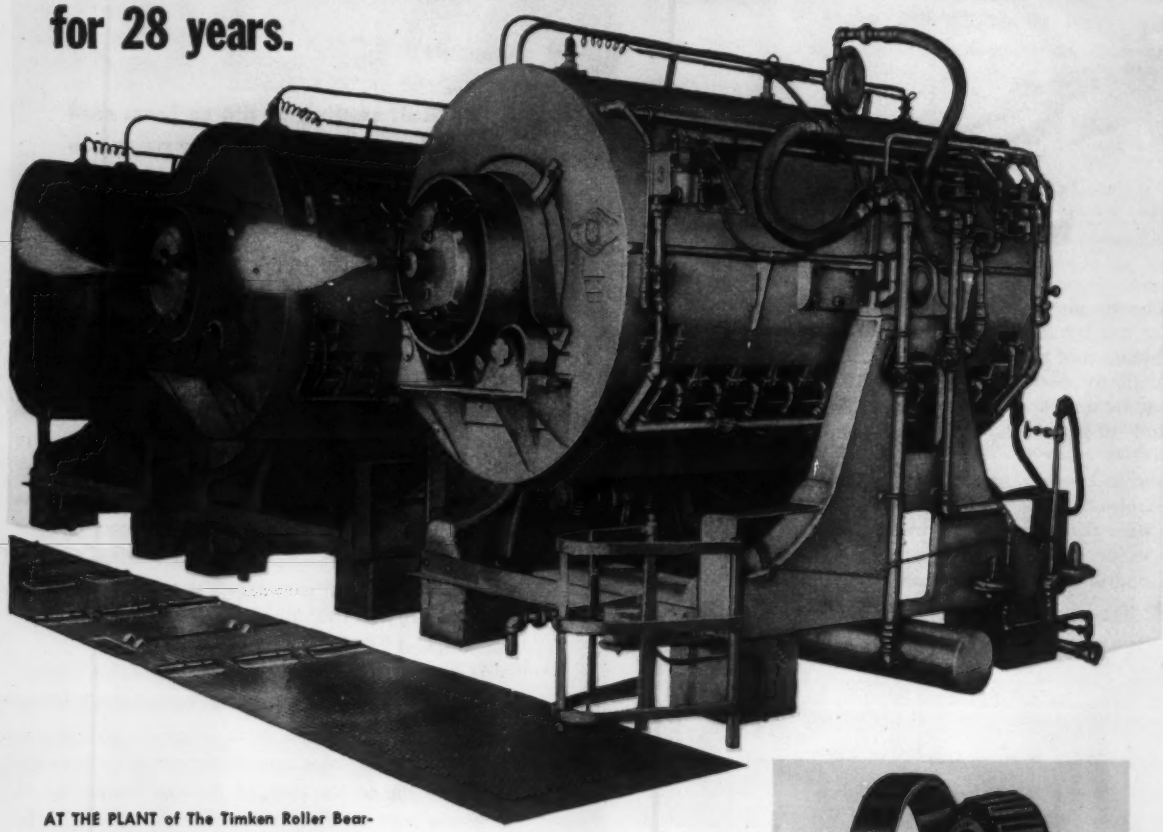
"Cities Service Delco #36 Core Oil enabled us to meet these requirements perfectly. We certainly recommend it where great strength and high collapsibility are needed."

Like Nemco, scores of other foundries have reported unusual results with problem-solving Cities Service Core Oils. Nor does the praise end with the product . . . for time and again the solution for the proper core oil has resulted from the knowledge, understanding and experience of a Cities Service Lubrication Engineer. If you have a lubrication problem, why not talk it over with one of these Cities Service experts? Or write: Cities Service Oil Company, 20 North Wacker Drive, Chicago 6, Ill.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

# AGF ROTARY RETORT CARBURIZERS have been used for heat treating TIMKEN ROLLER BEARINGS for 28 years.



**AT THE PLANT** of The Timken Roller Bearing Company in Canton, Ohio, more than 22 of these AGF Model No. 4 Rotary Retort Carburizers have been purchased over a period of years for carburizing rollers and races of roller bearings.

Each furnace is capable of receiving loads of 1000 to 1300 pounds depending upon the size and shape of the work. A cold charge is raised to carburizing temperature within 1½ to 2 hours from the time it is introduced and, of course, the carburizing cycle is maintained at temperatures up to 1700°, depending upon the case depth required.

Deep quenching tanks are located in front of the machines for end of cycle quenching.

**MANY ADVANTAGES.** Since 1925, TIMKEN has used AGF Rotary Carburizers. The ones shown were photographed after 9 or 10 years of operation. They are easy to maintain, convenient to use and have innumerable exclusive features.

Most important in carburizing rollers for roller bearings, the constant rotation of the work in the rotating retort leaves no possibility of variations in case. "Point of contact" carburizing case variations are entirely eliminated by this positive method. Three separate control zones assure uniform temperatures throughout the work space.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

TIMKEN Roller Bearing quality is known throughout the world and American Gas Furnace Co. is proud to have furnished some of the production equipment that helped establish and maintain that quality. AGF has furnished TIMKEN more than 100 heat treating and carburizing furnaces.

For 76 years AGF has PIONEERED in the invention, development and manufacture of industrial gas equipment for heat treating and other processes. Submit your problems to AGF metallurgists and engineers. WRITE for New Catalog. NOW.

AMERICAN GAS FURNACE CO.

996 LAFAYETTE STREET — ELIZABETH 4, N. J.

# Market Outlook

STEEL DEMAND isn't as strong as it was, but no one is worried. The respite is welcome. It means fewer customers have to be told "no," and deliveries can be prompter.

Steel producers are still in good position orderwise. They can sell all they make. The easing has erased only some of the surplus business.

**SLOWER**—Principally affected are the forms of steel used by the automobile industry—hot-rolled and cold-rolled carbon sheets, hot-rolled and cold-finished carbon bars and automotive wire. But automotive buyers have not cut their steel orders as much as they have reduced production. And auto cutbacks are not alarming or drastic. (The February pace of production started out above the level where January ended.) Cumulative passenger car production this year is down 12 per cent. In contrast, truck output is up 14 per cent.

**BLESSING IN DISGUISE**—A further decline in steel demand might even be welcomed by steel producers. Most of them are expanding and improving their mills, and they need steel to do so. Currently, they're having the same trouble as everyone else—getting steel. This year, the iron and steel industry in the U. S. will spend an estimated $1.2 billion for new equipment and construction, compared with $730 million last year.

**FULL SPEED**—For the last month, output of steel for ingots and castings has averaged 99 per cent of capacity. In that period, records were set for weekly production. The 99-per-cent rate held through the week ended Feb. 12.

Helping keep the over-all demand for steel high are the calls for constructional forms of steel—structural shapes, plates and reinforcing bars. Plate inquiry exceeds supply, with no early signs of easing. One of the consumers—shipbuilding—is upping its requirements through the receipt of orders for 14 tankers. They will use 100,000 tons of steel, mostly plates.

**BOOKED UP**—Line pipe and oil country tube producers have full order books for most of this year. Prosperity extends to other tubular products, too. Electric power capacity expansion is building up demand for seamless pressure tubing. The electric power industry, which is setting output records, is spending $3.75 billion this year for plant and equipment (see p. 83).

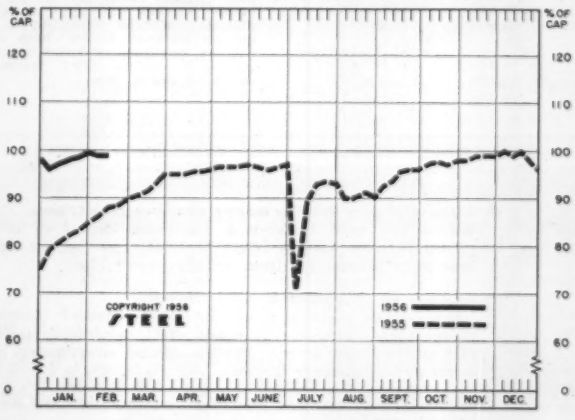
**IN SEASON**—Seasonal factors are adding to steel demand, too. Merchant wire products, such as farm fence, are picking up slowly as the season for their use approaches. Expansion of industrial plants (see p. 81) also will boost the need for fence wire.

An incentive to buy steel now is the likelihood of a general increase in steel prices during the coming summer, following wage negotiations.

**PRICES**—The scattered moves over the last couple of months to increase steel prices were noticeably absent in the week ended Feb. 8. STEEL's price composite on finished steel remains at $127.91 a net ton.

Steelmaking scrap continued its slide for the third consecutive week. This lowered STEEL's price composite on steelmaking grades to $50.33 a gross ton, a 17-cent decline from the preceding week and a $3.00 drop from the high point of a few weeks ago.

## NATIONAL STEELWORKS OPERATIONS




## DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

| | Week Ended Feb. 12 | Change | Same Week 1955 | Same Week 1954 |
|---|---|---|---|---|
| Pittsburgh | 101.5 | 0* | 84 | 86.5 |
| Chicago | 98.5 | — 3* | 91 | 81.5 |
| Mid-Atlantic | 101 | — 1 | 85 | 75 |
| Youngstown | 98 | 0 | 89 | 63 |
| Wheeling | 100.5 | 0 | 95.5 | 75 |
| Cleveland | 99.5 | — 1.5 | 95 | 80.5 |
| Buffalo | 105 | 0 | 100 | 83 |
| Birmingham | 95.5 | — 1 | 79 | 76.5 |
| New England | 88 | — 1 | 79 | 53 |
| Cincinnati | 98.5 | + 2 | 90.5 | 73.5 |
| St. Louis | 90 | —16 | 86.5 | 35.5 |
| Detroit | 99 | + 2 | 84.5 | 80.5 |
| Western | 107 | 0 | 87 | 71 |
| National Rate | 99 | 0 | 88 | 74 |

## INGOT PRODUCTION‡

| | Week Ended Feb. 12 | Week Ago | Month Ago | Year Ago |
|---|---|---|---|---|
| INDEX (1947-1949=100) | 149.6† | 152.1 | 151.1 | 130.4 |
| NET TONS (In thousands) | 2,403† | 2,444 | 2,428 | 2,095 |

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954

# Price Indexes and Composites

### FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

| | Feb. 7 1956 | Jan. 31 1956 | Month Ago | Jan. Average |
|---|---|---|---|---|
| (1947-1949=100) | 157.1 | 157.0 | 155.6 | 155.3 |

### AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 7

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

| | | | |
|---|---|---|---|
| Rails, Standard, No. 1 | $4.800 | Sheets, Electrical | $10.175 |
| Rails, Light, 40 lb | 6.217 | Strip, C.R., Carbon | 8.243 |
| Tie Plates | 5.625 | Strip, C.R., Stainless, 403 (lb) | 0.444 |
| Axles, Railway | 8.000 | Strip, H.R., Carbon | 5.606 |
| Wheels, Freight Car, 33 in. (per wheel) | 52.50 | Pipe, Black, Buttweld (100 ft) | 16.997 |
| Plates, Carbon | 5.200 | Pipe, Galv., Buttweld (100 ft) | 21.137 |
| Structural Shapes | 4.867 | Pipe, Line (100 ft) | 167.250 |
| Bars, Tool Steel, Carbon (lb) | 0.460 | Casing, Oil Well, Carbon (100 ft) | 165.120 |
| Bars, Tool Steel Alloy, Oil Hardening Die (lb) | 0.560 | Casing, Oil Well, Alloy (100 ft) | 244.670 |
| Bars, Tool Steel, H. R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb) | 1.185 | Tubes, Boiler (100 ft) | 39.470 |
| Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4, V 1 (lb) | 1.680 | Tubing, Mechanical, Carbon | 20.980 |
| Bars, H.R., Alloy | 9.425 | Tubing, Mechanical Stainless, 304 (100 ft) | 178.897 |
| Bars, H.R., Stainless, 303 (lb) | 0.450 | Tin Plate, Hot-dipped, 1.25 lb | 8.933 |
| Bars, H.R., Carbon | 5.500 | Tin Plate, Electrolytic, 0.25 lb | 7.633 |
| Bars, Reinforcing | 5.313 | Black Plate, Canmaking Quality | 6.733 |
| Bars, C.F., Carbon | 8.800 | Wire, Drawn, Carbon | 8.575 |
| Bars, C.F., Alloy | 12.250 | Wire, Drawn, Stainless 430 (lb) | 0.587 |
| Bars, C.F., Stainless, 302 (lb) | 0.473 | Bale ties (bundle) | 6.473 |
| Sheets, H.R., Carbon | 5.345 | Nails, Wire, 8d Common | 8.595 |
| Sheets, C.R., Carbon | 6.214 | Wire, Barbed (80-rod spool) | 7.847 |
| Sheets, Galvanized | 7.770 | Woven Wire Fence (20-rod roll) | 18.635 |
| Sheets, C.R., Stainless 302 (lb) | 0.588 | | |

### STEEL's FINISHED STEEL PRICE INDEX*

| | Feb. 8 1956 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Index (1935-39 av.=100) | 209.10 | 209.10 | 209.10 | 194.53 | 171.92 |
| Index in cents per lb | 5.665 | 5.665 | 5.665 | 5.270 | 4.657 |

### STEEL's ARITHMETICAL PRICE COMPOSITES

| | | | | | |
|---|---|---|---|---|---|
| Finished Steel, NT* | $127.91 | $127.91 | $127.91 | $117.82 | $106.32 |
| No. 2 Fdry, Pig Iron, GT | 58.99 | 58.99 | 58.99 | 56.54 | 52.54 |
| Basic Pig Iron, GT | 58.49 | 58.49 | 58.49 | 56.04 | 52.16 |
| Malleable Pig Iron, GT | 59.77 | 59.77 | 59.77 | 57.27 | 53.27 |
| Steelmaking Scrap, GT | 50.33 | 50.50 | 53.33 | 36.33 | 44.00 |

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

# Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

| FINISHED STEEL | Feb. 8 1956 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Bars, H.R., Pittsburgh | 4.65 | 4.65 | 4.65 | 4.30 | 3.70 |
| Bars, H.R., Chicago | 4.65 | 4.65 | 4.65 | 4.30 | 3.70 |
| Bars, H.R., deld. Philadelphia | 4.90 | 4.90 | 4.90 | 4.55 | 4.18 |
| Bars, C.F., Pittsburgh | 6.25* | 6.25* | 5.90 | 5.40 | 4.55 |
| Shapes, Std., Pittsburgh | 4.60 | 4.60 | 4.60 | 4.25 | 3.65 |
| Shapes, Std., Chicago | 4.60 | 4.60 | 4.60 | 4.25 | 3.65 |
| Shapes, deld., Philadelphia | 4.88 | 4.88 | 4.88 | 4.53 | 3.90 |
| Plates, Pittsburgh | 4.50 | 4.50 | 4.50 | 4.225 | 3.70 |
| Plates, Chicago | 4.50 | 4.50 | 4.50 | 4.225 | 3.70 |
| Plates, Coatesville, Pa. | 4.80 | 4.80 | 4.80 | 4.225 | 4.15 |
| Plates, Sparrows Point, Md. | 4.50 | 4.50 | 4.50 | 4.225 | 3.70 |
| Plates, Claymont, Del. | 4.80 | 4.80 | 4.80 | 4.225 | 4.15 |
| Sheets, H.R., Pittsburgh | 4.325 | 4.325 | 4.325 | 4.05 | 3.60-3.75 |
| Sheets, H.R., Chicago | 4.325 | 4.325 | 4.325 | 4.05 | 3.60 |
| Sheets, C.R., Pittsburgh | 5.325 | 5.325 | 5.325 | 4.95 | 4.35 |
| Sheets, C.R., Chicago | 5.325 | 5.325 | 5.325 | 4.95 | 4.35 |
| Sheets, C.R., Detroit | 5.325-5.425 | 5.325-5.425 | 5.325-5.425 | 5.10 | 4.55 |
| Sheets, Galv., Pittsburgh | 5.85 | 5.85 | 5.85 | 5.45 | 4.80 |
| Strip, H.R., Pittsburgh | 4.325 | 4.325 | 4.325 | 4.05 | 3.75-4.00 |
| Strip, H.R., Chicago | 4.325 | 4.325 | 4.325 | 4.05 | 3.50 |
| Strip, C.R., Pittsburgh | 6.25 | 6.25 | 6.25 | 5.75 | 4.65-5.35 |
| Strip, C.R., Chicago | 6.25-6.35 | 6.25-6.35 | 6.25-6.35 | 5.85 | 4.90 |
| Strip, C.R., Detroit | 6.35 | 6.35 | 6.35 | 5.90 | 4.35-5.60 |
| Wire, Basic, Pittsburgh | 6.60 | 6.60 | 6.60 | 5.75 | 4.85-5.10 |
| Nails, Wire, Pittsburgh | 7.60 | 7.60 | 7.60 | 6.85 | 5.90-6.20 |
| Tin plate (1.50 lb), box, Pitts. | $9.45 | $9.45 | $9.45 | $9.05 | $8.70 |

*Including 0.35c for special quality.

| SEMIFINISHED STEEL | | | | | |
|---|---|---|---|---|---|
| Billets, Forging, Pitts. (NT) | $84.50 | $84.50 | $84.50 | $78.00 | $66.00 |
| Wire rods, $\frac{7}{32}$-$\frac{1}{2}$" Pitts. | 5.025-5.375 | 5.025-5.375 | 5.025 | 4.675 | 4.10-4.30 |

| PIG IRON, Gross Ton | | | | | |
|---|---|---|---|---|---|
| Bessemer, Pitts. | $59.50 | $59.50 | $59.50 | $57.00 | $53.00 |
| Basic, Valley | 58.50 | 58.50 | 58.50 | 56.00 | 52.00 |
| Basic, deld. Phila. | 62.16 | 62.16 | 62.16 | 59.66 | 56.39 |
| No. 2 Fdry, Pitts. | 59.00 | 59.00 | 59.00 | 56.50 | 52.50 |
| No. 2 Fdry, Chicago | 59.00 | 59.00 | 59.00 | 56.50 | 52.50 |
| No. 2 Fdry, Valley | 59.00 | 59.00 | 59.00 | 56.50 | 52.50 |
| No. 2 Fdry, deld. Phila. | 62.66 | 62.66 | 62.66 | 55.16 | 56.89 |
| No. 2 Fdry, Birm. | 55.00 | 55.00 | 55.00 | 52.88 | 48.88 |
| No. 2 Fdry (Birm.) deld. Cin. | 62.70 | 62.70 | 62.70 | 60.58 | 55.58 |
| Malleable, Valley | 59.00 | 59.00 | 59.00 | 56.50 | 52.50 |
| Malleable, Chicago | 59.00 | 59.00 | 59.00 | 56.50 | 52.50 |
| Ferromanganese, Duquesne | 205.00† | 205.00† | 205.00† | 190.00† | 188.00* |

†74-76% Mn, net ton. *75-82% Mn. gross ton, Etna, Pa.

| SCRAP, Gross Ton (Including broker's commission) | | | | | |
|---|---|---|---|---|---|
| No. 1 Heavy Melt, Pitts. | $50.50 | $49.50 | $51.50 | $38.00 | $45.00 |
| No. 1 Heavy Melt, E. Pa. | 51.50 | 53.00 | 55.00 | 37.00 | 43.50 |
| No. 1 Heavy Melt, Chicago | 49.00 | 49.00 | 50.50 | 34.00 | 43.50 |
| No. 1 Heavy Melt, Valley | 53.00 | 53.00 | 58.50 | 36.50 | 45.00 |
| No. 1 Heavy Melt, Cleve. | 49.50 | 50.50 | 54.50 | 34.00 | 44.00 |
| No. 1 Heavy Melt, Buffalo | 46.50 | 47.50 | 47.50 | 32.50 | 44.00 |
| Rails, Rerolling, Chicago | 66.50 | 69.00 | 72.50 | 49.50 | 52.50 |
| No. 1 Cast, Chicago | 46.50 | 48.50 | 51.50 | 40.00 | 49.00 |

| COKE, Net Ton | | | | | |
|---|---|---|---|---|---|
| Beehive, Furn, Connlsvl. | $14.125 | $14.125 | $14.125 | $13.75 | $14.75 |
| Beehive, Fdry, Connlsvl. | 16.50 | 16.50 | 16.50 | 16.75 | 17.50 |
| Oven, Fdry, Chicago | 27.00 | 27.00 | 27.00 | 24.50 | 21.00 |

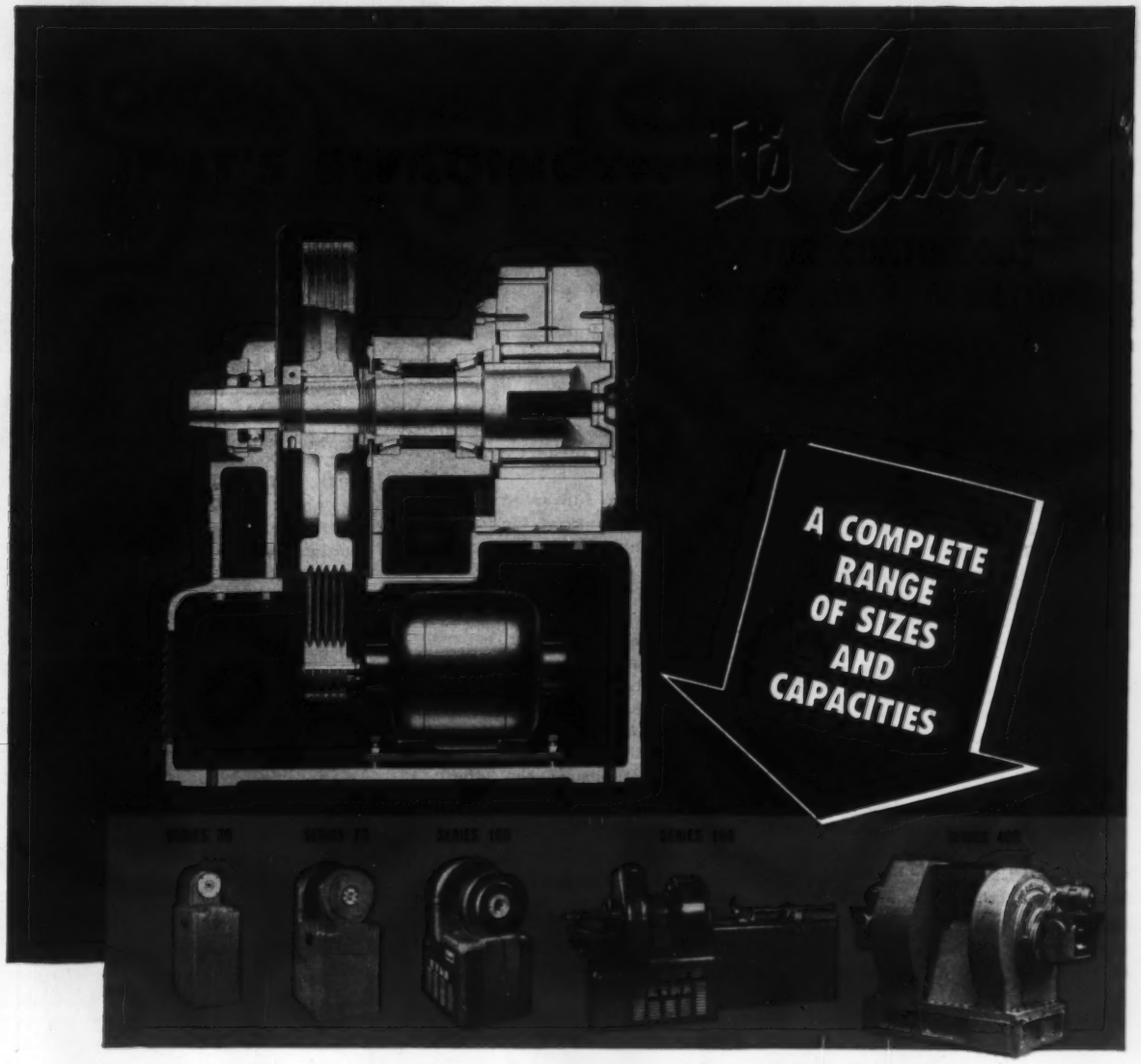
# Daily Nonferrous Price Record

| | Price Feb. 8 | Last Change | Previous Price | Jan. Avg. | Dec. Avg. | Feb. 1955 Avg. |
|---|---|---|---|---|---|---|
| Copper | 43.00–52.00 | Feb. 2, 1956 | 43.00–51.00 | 46.700 | 46.053 | 33.000 |
| Lead | 15.80 | Jan. 13, 1956 | 16.30 | 15.960 | 15.358 | 14.800 |
| Zinc | 13.50 | Jan. 6, 1956 | 13.00 | 13.440 | 13.000 | 11.500 |
| Tin | 100.25 | Feb. 8, 1956 | 99.75 | 105.067 | 107.98 | 90.908 |
| Nickel | 64.50 | Nov. 24, 1954 | 60.00 | 64.500 | 64.500 | 64.500 |
| Aluminum | 24.40 | Aug. 8, 1955 | 23.20–24.40 | 24.400 | 24.400 | 23.200 |
| Magnesium | 32.50 | Aug. 16, 1955 | 28.50 | 32.500 | 32.500 | 27.000 |

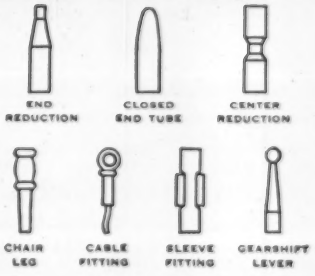
Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

## What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**




For tapering, sizing, reducing and forming to special shapes of round solids and steel tubing, the Etna Swaging Machine offers the ultimate in modern machine design. Regardless of size and description of the job to be done, there's an Etna swager right for *greater production*. Write today regarding your specific job problems.




**It's New! Get full information on the blending into the wall of I. D. Bead on steel and stainless steel tube with Etna Swagers resulting in mirror finish. Bead also removed on conduit.**

# Abbey ETNA Company

**3402 MAPLEWOOD AVE., TOLEDO 10, OHIO**

# Nonferrous Metals

**Aluminium Ltd. reports on some of the world aspects of aluminum as producers continue to map expansion plans. Conclusion: There's plenty of room to grow**

Nonferrous Metal Prices, Pages 134 & 135

ALUMINUM is often thought of as an American metal, while copper, lead, zinc, nickel and tin are considered in terms of world markets and conditions.

**Not So**—Nathanael V. Davis, president, Aluminium Ltd., Canada, explains that aluminum, so far as Alcan (its chief subsidiary) is concerned, must be considered on a world-wide basis. He reports: "The major producing countries in order of importance in 1955 were the U. S., Canada, West Germany, France, Norway, Austria, Italy, Japan and Britain."

Most of those countries use their entire production for home use. Only Canada, Norway and to a lesser extent, Austria, can be called important exporters of primary aluminum. Says Mr. Davis: "At least 75 per cent of all the aluminum that moves in international trade is exported from Canada."

**More Customers**—Mr. Davis points out that the independent fabricator is becoming one of Alcan's best customers. In the U. S. alone, it is estimated that there are 24,000 companies which handle aluminum in some form. While Canada's domestic market has never consumed more than about 15 per cent of Aluminium's production, it is now its fastest growing market. Will the Big Three's expansion in the U. S. (Alcoa, Kaiser, Reynolds) dampen Aluminium's expansion plans? "It may seem as if almost everyone in the aluminum industry is an incorrigible optimist," says Mr. Davis. "The outlook continues to be one of substantial growth so far as we are concerned."

Alcan will go full speed ahead on its planned expansions for its facilities at Kitimat and Quebec. Capital outlays (from 1950 to 1959) will come to $790 million, better than $1.5 million per week.

**Irony**—While plans for expansion and increased markets continue to dominate the aluminum news, the ironical twist is the Justice department's bid to continue Alcoa under court jurisdiction because it is not definitely established that there is competition in the aluminum industry (STEEL, Feb. 6, p. 77).

## Magnesium Production Up

Magnesium stirred up the metal industry last week as Dow Chemical Co. announced that its facilities at Freeport and Valasco, Tex., are operating at capacity (75,000 tons annually). A Dow spokesman reports: "We are building inventories in anticipation of increased demand."

This set off speculation as to what Dow has "on the fire." Consensus: There may be a new automotive application for magnesium coming in the near future.

Dow is quick to point out that inventory building is necessary. It estimates that consumption of both primary and secondary magnesium during 1955 was 65,000 tons (primary, 55,000 tons; secondary, 10,000 tons). Production, estimates Dow, was about 61,130 tons. Consumption in 1954 was 55,000 tons, while production was about 69,729 tons.

## Titanium Demand Skyrockets

New facilities for melting titanium may be able to get rapid write-offs again. The sharp increase in demand for titanium products is causing the Office of Defense Mobilization to relent. Four applications are on file with the General Services Administration. Two are eligible for consideration under ODM's 60-day rule revocation (STEEL, Feb. 6, p. 82).

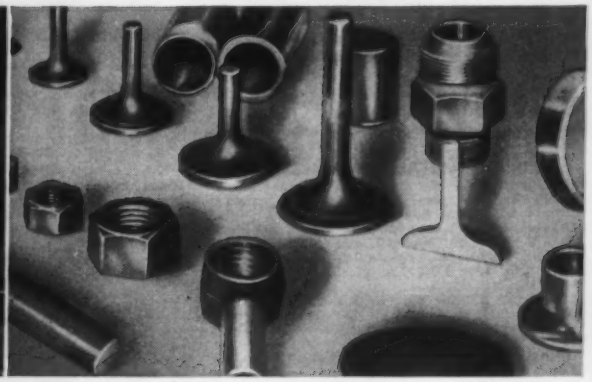
## Market Memos

- Alcoa started production five weeks ahead of schedule at its Texas expansion project. At Point Comfort, expanded potroom facilities are in production. The first of two new potlines will be in operation by Mar. 1 at Rockdale.
- W. Lunsford Long, president of the Tungsten Institute and Haile Mines Inc., reports: "Air Force regulations set up early in the Korean War are still limiting the use of tungsten in jet engines." Mr. Long points out that when the restrictions were put on, domestically mined tungsten totaled less than 4 million lb. Last year, contained tungsten production reached 15 million lb. Domestic consumption, which was twice as much as the abnormal low in '54, reached 8.8 million lb. Says Mr. Long: "Only by removal of Defense department restrictions on tungsten in jet power plants may better standards in jet aircraft safety be established and greater research programs for improved high-temperature alloys be put into force."

**Covered with Copper**

A new terminal building for St. Louis' municipal airport features copper and its alloys. More than 50,000 sq ft of 20-oz, cold-rolled sheet copper cover the roof—it has three intersecting barrel-vaulted sections with six intersecting dormer arches. It was applied with batten seam construction. Copper tube was specified for all hot and cold lines and for part of the heating system. Air conditioning units and the terminal's plumbing system will contain copper, too

*Mounted so its "eye" is only 4 inches from the work, Rayotube sights between heating coils directly on work surface. Speedomax controller records work temperature; automatically shuts off induction heater.*



*Typical of parts forged by Super Alloy are nuts and bolts for jet engines, chemical vats and pipe lines, valves for diesel engines, automobile tie-rods and initiator chambers to trigger the ejection seats of jet aircraft.*

## HEATING BY INDUCTION?

# Let "Work Temperature" be your guide!

**"Heat It Right and You Can Forge It Right!"** says John E. Connolly, President of Super Alloy Forge, Inc., Hamburg, Michigan and a pioneer in forging such materials as titanium, zirconium, and the various alloys of cobalt, tungsten, chromium and other expensive metals.

Key to the automatic temperature control of the induction heating operation prior to forging, is a high-speed, small target Rayotube® detector and Speedomax® G controller.

"Our work calls for such extreme accuracy, we just couldn't operate economically without the Rayotube," says Mr. Connolly. "It gives us complete flexibility of working temperatures over a 2000 F range and it's so sensitive we can hold within ± 5 to 10 degrees. Believe me when you're working with metal that costs as much as $20.00 a pound, you've got to have equipment that's dependable or you can't afford to operate."

If, like Super Alloy Forge, you are presently heating by induction or contemplating it in the future, either experimentally or in an automated production line, this Rayotube-Speedomax combination may be your answer to accurate temperature control . . . your key to reproducible results on a continuous production basis. To investigate just write us at 4957 Stenton Ave., Phila. 44, Pa. and ask for Folder NS3(2).

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# Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

## PRIMARY METALS AND ALLOYS

**Aluminum:** 99 + %, ingots, 24.40; pigs 22.50. 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

**Aluminum Alloy:** No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

**Antimony:** R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

**Beryllium:** 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

**Beryllium Aluminum:** 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

**Beryllium Copper:** 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

**Bismuth:** $2.25 per lb ton lots.

**Cadmium:** Sticks and bars $1.70 per lb, deld.

**Cobalt:** 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

**Columbium:** Powder, $119.20 per lb, nom.

**Copper:** Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 51.00-52.00 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

**Germanium:** First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

**Gold:** U. S. Treasury, $35 per oz.

**Indium:** 99.9%, $2.25 per troy oz.

**Iridium:** $100-$120 nom, per troy oz.

**Lead:** Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

**Lithium:** 99%+, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

**Magnesium:** 99.8% self-palletizing pig, 32.50; notched ingot, 32.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

**Magnesium Alloys:** AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50. AZ91B, 31.00, Madison, Ill.

**Mercury:** Open market, spot, New York, $271-$275 per 76-lb flask.

**Molybdenum:** Powder 99% hydrogen reduced, $3-$3.35 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

**Nickel:** Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

**Osmium:** $80-$100, nom, per troy oz.

**Palladium:** $22-$24 per troy oz.

**Platinum:** $97-$112 per troy oz from refineries.

**Radium:** $16-$21.50 per mg radium content, depending on quantity.

**Rhodium:** $120-$125 per troy oz.

**Ruthenium:** $45-$55 per troy oz.

**Selenium:** 99.5%, $13.50-$15.50 per lb.

**Silver:** Open market, 90.25 per troy oz.

**Sodium:** 16.50, c.l.; 17.00 l.c.l.

**Tantalum:** Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

**Tellurium:** $1.50-$1.75 per lb.

**Thallium:** $12.50 per lb.

**Tin:** Straits, N. Y., spot, 100.25; prompt, 99.50.

**Titanium:** Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45; grade A-2 (0.5% Fe max), $3.15 per pound.

**Tungsten:** Powder, 98.8%, carbon reduced, 1000-lb lots, $4.30 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $5.00. Treated ingot, $6.70.

**Zinc:** Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

**Zirconium:** Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

## SECONDARY METALS AND ALLOYS

**Aluminum Ingot:** Piston alloys, 31.25-32.25; No. 12 foundry alloy (No. 2 grade) 30.00-30.25; 5% silicon alloy, 0.60 Cu max, 31.50-31.75; 13 alloy, 0.60 Cu max, 31.50-31.75; 195 alloy, 31.50-31.75; 108 alloy, 30.00. Steel deoxidizing grades notch bars, granulated or shot: Grade 1, 30.75-31.25; grade 2, 29.75; grade 3, 29.00; grade 4, 28.00-29.00.

**Brass Ingot:** Red brass No. 115, 42.00; tin bronze No. 225, 56.00; No. 245, 48.75; high-leaded tin bronze No. 305, 45.75; No. 1 yellow No. 405, 33.25; manganese bronze No. 421, 37.75.

**Magnesium Alloy Ingot:** AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

## NONFERROUS MILL PRODUCTS

### BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

### COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l. 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

### LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

### TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

### ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00-24.00; ribbon zinc in coils, 20.50-21.50; plates, 20.00-22.25.

### ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

### NICKEL, MONEL, INCONEL

| | "A" Nickel | Monel | Inconel |
|---|---|---|---|
| Sheets, C.R. | 102 | 83 | 99 |
| Strip, C.R. | 102 | 92 | 125 |
| Plate, H.R. | 97 | 87 | 95 |
| Rod, Shapes, H.R. | 87 | 74 | 93 |
| Seamless Tubes | 122 | 110 | 153 |
| Shot, Blocks | ... | 71 | ... |

### ALUMINUM

**Screw Machine Stock:** 30,000 lb base.

| Diam. (in.) or across flats | Round 2011-T3 | Round 2017-T4 | Hexagonal 2011-T3 | Hexagonal 2017-T4 |
|---|---|---|---|---|
| **Drawn** | | | | |
| 0.125 | 67.9 | 66.4 | ... | ... |
| 0.156-0.172 | 57.5 | 55.9 | ... | ... |
| 0.188 | 57.5 | 55.9 | ... | 71.7 |
| 0.219-0.234 | 54.5 | 52.9 | ... | ... |
| 0.250-0.281 | 54.5 | 52.9 | ... | 68.4 |
| 0.313 | 54.5 | 52.9 | ... | 65.2 |
| **Cold-finished** | | | | |
| 0.375-0.547 | 53.4 | 51.4 | 63.7 | 61.3 |
| 0.563-0.688 | 53.4 | 51.4 | 60.6 | 57.5 |
| 0.750-1.000 | 52.1 | 50.1 | 55.4 | 54.2 |
| 1.063 | 52.1 | 50.1 | ... | 52.3 |
| 1.125-1.500 | 50.1 | 48.2 | 53.6 | 52.3 |
| **Rolled** | | | | |
| 1.563 | 48.8 | 46.9 | ... | ... |
| 1.625-2.000 | 48.2 | 46.2 | ... | 50.5 |
| 2.125-2.500 | 47.0 | 45.0 | ... | ... |
| 2.563-3.375 | 45.6 | 43.6 | ... | ... |

### ALUMINUM

**Sheet and Circles:** 1100 and 3003 mill finish (30,000 lb base; freight allowed)

| Thickness Range Inches | Flat Sheet | Flat Sheet Circles* | Coiled Sheet | Coiled Sheet Circles† |
|---|---|---|---|---|
| 0.249-0.136 | 37.5 | 42.3 | ... | ... |
| 0.135-0.096 | 38.0 | 43.2 | ... | ... |
| 0.095-0.077 | 38.7 | 44.2 | 36.1 | 41.3 |
| 0.076-0.061 | 39.3 | 45.1 | 36.3 | 41.5 |
| 0.060-0.048 | 39.9 | 45.6 | 36.7 | 42.0 |
| 0.047-0.038 | 40.4 | 46.5 | 37.2 | 42.4 |
| 0.037-0.030 | 40.8 | 47.0 | 37.6 | 43.1 |
| 0.029-0.024 | 41.4 | 47.5 | 37.9 | 43.6 |
| 0.023-0.019 | 42.2 | 49.0 | 38.8 | 44.5 |
| 0.018-0.017 | 43.0 | ... | 39.4 | 45.4 |
| 0.016-0.015 | 43.9 | ... | 40.2 | 46.6 |
| 0.014 | 44.9 | ... | 41.2 | 47.9 |
| 0.013-0.012 | 46.1 | ... | 41.9 | 48.9 |
| 0.011 | 47.1 | ... | 43.1 | 50.5 |
| 0.010-0.0095 | 48.4 | ... | 44.3 | 52.2 |
| 0.009-0.0085 | 49.7 | ... | 45.8 | 54.3 |
| 0.008-0.0075 | 51.3 | ... | 47.0 | 56.1 |
| 0.007 | 52.8 | ... | 48.5 | 58.4 |
| 0.006 | 54.4 | ... | 49.9 | 63.4 |

*48 in. max diam. †26 in. max diam.

### ALUMINUM

**Plates and Circles:** Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

| Alloy | Plate Base | Circle Base |
|---|---|---|
| 1100-F, 3003-F | 36.5 | 40.8 |
| 5050-F | 37.6 | 41.9 |
| 3004-F | 38.6 | 43.8 |
| 5052-F | 39.9 | 45.2 |
| 6061-T6 | 41.1 | 46.0 |
| 2024-T4* | 43.6 | 49.9 |
| 7075-T6* | 51.4 | 58.5 |

*24-48 in. widths or diam, 72-180 lengths.

### ALUMINUM

**Forging Stock:** Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

**Pipe:** ASA Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

| Nom. Pipe Size (in.) | | Nom. Pipe Size (in.) | |
|---|---|---|---|
| ⅜ | $16.85 | 2 | $ 51.95 |
| 1 | 26.50 | 4 | 143.00 |
| 1¼ | 35.85 | 6 | 256.70 |
| 1½ | 42.90 | 8 | 386.30 |

### MAGNESIUM

**Sheet:** AZ31, commercial grade, 0.032 in., 99.00; 0.064 in., 78.00; 0.125 in., 63.50, 30,000 lb and over, f.o.b. mill.

**Plate:** AZ31, 61.00, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in., tread plate, 64.00, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate 66.00, 30,000 lb or more, 0.250-3.000 in., widths 60-72 in., lengths 72-180 in.

**Extrusions:** AZ31 commercial grade, rectangles, ¼ x 2 in., 64.70; 1 x 4 in., 69.50. Rod, 1 in., 61.50; 2 in., 59.00. Tubing, 1 in. OD x 0.065 in., 82.50. Angles, 1 x 1 x ⅛-in., 68.40; 2 x 2 x ¼-in., 62.50. Channels, 5 in., 63.40. I-beams, 5 in., 62.70.

## NONFERROUS SCRAP

### DEALERS BUYING PRICES

(Cents per pound, New York, in ton lots)

**Aluminum:** 1100 clippings, 20.50-21.00; old sheets, 17.00-17.50; borings and turnings, 11.00-11.50; crankcases, 17.00-17.50; industrial castings, 17.00-17.50.

**Copper and Brass:** No. 1 heavy copper and wire, 41.50-42.00; No. 2 heavy copper and wire, 37.50-38.00; light copper, 35.00-35.50; No. 1 composition red brass, 31.50-32.00; No. 1 composition turnings, 30.50-31.00; yellow

## BRASS MILL PRICES

| | MILL PRODUCTS a | | | SCRAP ALLOWANCES f | | | |
|---|---|---|---|---|---|---|---|
| | Sheet, Strip, Plate | Rod | Wire | Seamless Tube | Clean Heavy | Rod Ends | Clean Turnings |
| Copper | 63.13-64.13b | 60.36-61.36c | .... | 63.32-64.32 | 39.000 | 39.000 | 38.250 |
| Yellow Brass | 52.27-53.60 | 42.81-43.80d | 52.81-54.14 | 55.18-56.51 | 29.250 | 29.000 | 27.125 |
| Low Brass, 80% | 56.55-57.75 | 56.49-57.69 | 57.09-58.29 | 59.36-60.56 | 33.000 | 32.750 | 32.250 |
| Red Brass, 85% | 58.09-59.24 | 58.03-59.18 | 58.63-59.78 | 60.90-62.05 | 34.750 | 34.125 | 33.625 |
| Com. Bronze, 90% | 60.18-61.28 | 60.12-61.22 | 60.72-61.82 | 62.74-63.84 | 35.750 | 35.500 | 35.000 |
| Manganese Bronze | 59.37-60.92 | 53.38-54.86 | 63.82 | .... | 27.500 | 27.250 | 26.750 |
| Muntz Metal | 53.74-55.14 | 49.55-50.95 | .... | .... | 27.375 | 27.125 | 26.625 |
| Naval Brass | 55.63-57.10 | 49.94-51.41 | 62.69-64.16 | 58.79-60.26 | 27.125 | 26.875 | 26.375 |
| Silicon Bronze | 66.54 | 65.73 | 66.58 | 68.68e | 37.875 | 37.625 | 36.875 |
| Nickel Silver, 10% | 66.00-67.25 | 68.33g | 68.33 | .... | 32.750 | 32.500 | 16.375 |
| Phos. Bronze, A, 5% | 80.99-82.52 | 81.49-83.02 | 81.49-93.02 | 82.67-84.20 | 39.750 | 39.500 | 38.125 |

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

**brass turnings**, 16.50-17.00; new brass clippings, 27.50-28.00; light brass, 19.00-19.50; heavy yellow brass, 22.00-22.50; new brass rod ends, 26.00-26.50; auto radiators, unsweated, 24.00-24.50; cocks and faucets, 24.50-25.00; brass pipe 25.00-25.50.

**Lead:** Heavy, 12.75-13.25; battery plates, 7.00-7.25; linotype and stereotype, 14.00-14.50; electrotype, 13.25-13.75; mixed babbitt, 15.50.

**Magnesium:** Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

**Monel:** Clippings, 60.00-65.00; old sheets, 55.00-65.00; turnings, 50.00; rods, 59.50-65.00.

**Nickel:** Sheets and clips, 100.00-150.00; rolled anodes, 100.00-150.00; turnings, 85.00-125.00; rod ends, 100.00-150.00.

**Zinc:** Old zinc, 6.00-6.50; new die-cast scrap, 6.00; old die-cast scrap, 3.50.

### REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

**Aluminum:** 1100 clippings, 22.00; 3003 clippings, 22.25-22.50; 6151 clippings, 22.00-22.50; 5052 clippings, 22.00-22.50; 2014 clippings, 21.50-22.00; 2017 clippings, 21.50-22.00; 2024 clippings, 21.50-22.00; mixed clippings, 21.50-22.00; old sheet, 18.50-19.50; old cast, 18.50-19.50; clean old cable (free of steel), 22.50; borings and turnings, 19.50-20.50.

**Beryllium Copper:** Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00-39.00.

**Copper and Brass:** No. 1 heavy copper and wire, 42.00; No. 2 heavy copper and wire, 40.50; light copper 38.25; refinery brass (60% copper) per dry copper content, 38.00.

### INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

**Copper and Brass:** No. 1 heavy copper and wire, 42.00; No. 2 heavy copper and wire, 40.50; light copper, 38.75; No. 1 composition borings, 33.00; No. 1 composition solids, 34.00; heavy yellow brass solids, 23.00; yellow brass turnings, 22.00; radiators, 26.00.

### PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

### ANODES

**Cadmium:** Special or patented shapes, $1.70 per lb.

**Copper:** Flat-rolled, 59.79-60.79; oval 59.92, 5000-10,000 lb; electrodeposited, 57.75, 2000-5000 lb lots; cast 59.54, 5000-10,000 lb quantities.

**Nickel:** Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

**Tin:** Bar or slab; less than 200 lb, $1.185; 200-499 lb, $1.170; 500-999 lb, $1.165; 1000 lb or more, $1.160.

**Zinc:** Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

### CHEMICALS

**Cadmium Oxide:** $2.15 per lb, in 100-lb drums.

**Chromic Acid:** Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

**Copper Cyanide:** 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50.

**Copper Sulphate:** 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

**Nickel Chloride:** 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

**Nickel Sulphate:** 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

**Silver Cyanide:** (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

**Sodium Cyanide:** Egg, under 1000 lb, 19.80; 1000-19,900 lb 18.80; 20,000 lb, and over, 17.80; granular, add 1-cent premium to above.

**Sodium Stannate:** Less than 100 lb, 71.40; 100-600 lb, 62.90; 700-1900 lb, 60.40; 2000-9900 lb, 58.70; 10,000 lb or more, 57.50.

**Stannous Chloride (anhydrous):** Less than 25 lb, $1.683; 25 lb, $1.333; 100 lb, $1.183; 400 lb, $1.159; 5200-19,600 lb, $1.037; 20,000 lb or more, 91.50.

**Stannous Sulphate:** Less than 50 lb, $1.31; 50 lb, $1.01; 100-1900 lb, 99.00; 2000 lb or more, 97.00.

**Zinc Cyanide:** Under 1000 lb, 54.30; 1000 lb and over, 52.30.


# Abrasive Cutting

*the best way to cut many materials*
*the only way to cut some*

# Allison Cut-Off Wheels

## Wide variety of shapes and materials cut with abrasive wheels

• Speed and quality of cut make abrasive cutting ideal for a wide range of operations. For example: one inch diameter cold rolled steel can be cut with a wheel cost of under ½ cent per cut and in 3 seconds.

ALLISON Cut-Off Wheels can provide smooth, high-quality cutting for almost any type of material however hard. These include steels of practically all analyses including corrosion-resisting types, brass, bronze, Monel Metal and other non-ferrous: aluminum alloy, magnesium and many others.

## Whatever the problem there is an Allison Wheel to meet it . . .

Profitable abrasive cutting means using the right abrasive wheel . . . and the proper abrasive cut-off machine . . . for the specific job. If the required result is a smooth, fine finish, without hardening or metallurgical changes, a WET cut is called for. Rubber bonded ALLISON Wheels give long wheel life and high quality cuts for such an operation. If the cut is a big one (over 2″ solid) an OSCILLATING Cut-Off machine . . . with the proper ALLISON Wheel . . . will do the job fast and economically. Where quality requirements are less exacting, dry cutting with ALLISON resinoid bonded wheels is often the best method.

Allison ABRASIVE CUTTING WHEELS

## Consult a specialist for best results

• ALLISON specializes in the manufacture of abrasive cut-off wheels. Be sure that you are getting the most from your cutting methods. Abrasive wheel cutting is faster than sawing—in some cases it is 10 to 20 times as fast. The savings in cost can be tremendous. Why not let an ALLISON abrasive cutting specialist check your hardest cutting job?

ACCO
TRADE MARK

*Send for Booklet "ABRASIVE CUTTING" Today*

**ALLISON DIVISION**
**AMERICAN CHAIN & CABLE**

2548 Island Brook Avenue, Bridgeport 8, Conn.

# Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 137. Key to footnotes, page 139.

## SEMIFINISHED

**INGOTS, Carbon, Forging (NT)**

Munhall,Pa. U5 ..... $65.50

**INGOTS, Alloy (NT)**

Detroit R7 ..... $69.00
Houston S5 ..... 74.00
Midland,Pa. C18 ..... 69.00
Munhall,Pa. U5 ..... 69.00

**BILLETS, BLOOMS & SLABS**

**Carbon, Rerolling (NT)**

Aliquippa,Pa. J5 ..... $68.50
Bessemer,Pa. U5 ..... 68.50
Bridgeport,Conn. N19 .. 73.50
Buffalo R2 ..... 68.50
Clairton,Pa. U5 ..... 68.50
Ensley,Ala. T2 ..... 68.50
Fairfield,Ala. T2 ..... 68.50
Fontana,Calif. K1 ..... 76.00
Gary,Ind. U5 ..... 68.50
Johnstown,Pa. B2 ..... 68.50
Lackawanna,N.Y. B2 .. 68.50
LoneStar,Tex. L6 ..... 74.50
Munhall,Pa. U5 ..... 68.50
Pittsburgh J5 ..... 68.50
S.Chicago,Ill. R2, U5.. 68.50
S.Duquesne,Pa. U5 .... 68.50
Youngstown R2 ..... 68.50

**Carbon, Forging (NT)**

Aliquippa,Pa. J5 ..... $84.50
Bessemer,Pa. U5 ..... 84.50
Bridgeport,Conn. N19 .. 89.50
Buffalo R2 ..... 84.50
Canton,O. R2 ..... 86.50
Clairton,Pa. U5 ..... 84.50
Conshohocken,Pa. A3.. 89.50
Ensley,Ala. T2 ..... 84.50
Fairfield,Ala. T2 ..... 84.50
Fontana,Calif. K1 ..... 92.00
Gary,Ind. U5 ..... 84.50
Geneva,Utah C11 ..... 84.50
Houston S5 ..... 89.50
Johnstown,Pa. B2 ..... 84.50
Lackawanna,N.Y. B2.. 84.50
LosAngeles B3 ..... 94.00
Midland,Pa. C18 ..... 84.50
Munhall,Pa. U5 ..... 84.50
Pittsburgh J5 ..... 84.50
Seattle B3 ..... 98.00
S.Chicago R2,U5,W14 .. 84.50
S.Duquesne,Pa. U5 .... 84.50
S.SanFrancisco B3 .... 94.00

**Alloy, Forging (NT)**

Bethlehem,Pa. B2 .... $96.00
Buffalo R2 ..... 96.00
Canton,O. R2, T7 ..... 96.00
Conshohocken,Pa. A3.. 103.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 .... 115.00
Gary,Ind. U5 ..... 96.00
Houston S5 ..... 101.00
Ind.Harbor,Ind. Y1 ... 96.00
Johnstown,Pa. B2 .... 96.00
Lackawanna,N.Y. B2 .. 96.00
LosAngeles B3 ..... 116.00
Massillon,O. R2 ..... 96.00
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 96.00
S.Chicago R2,U5,W14.. 96.00
S.Duquesne,Pa. U5 .... 96.00
Struthers,O. Y1 ..... 96.00
Warren,O. C17 ..... 96.00

**ROUNDS, SEAMLESS TUBE (NT)**

Buffalo R2 ..... $103.50
Canton,O. R2 ..... 103.50
Cleveland R2 ..... 103.50
Gary,Ind. U5 ..... 103.50
S.Chicago R2, W14 .. 103.50
S.Duquesne,Pa. U5 ... 103.50

**SKELP**

Aliquippa,Pa. J5 ..... 4.325
LoneStar,Tex. L6 ..... 4.625
Munhall,Pa. U5 ..... 4.225
SparrowsPoint,Md. B2.. 4.225
Warren,O. R2 ..... 4.225
Youngstown R2, U5 ... 4.225

**WIRE RODS**

AlabamaCity,Ala. R2 .. 5.375
Aliquippa,Pa. J5 ..... 5.375
Alton,Ill. L1 ..... 5.55
Buffalo W12 ..... 5.375
Cleveland A7 ..... 5.375
Donora,Pa. A7 ..... 5.375
Fairfield,Ala. T2 ..... 5.375
Houston S5 ..... 5.625
IndianaHarbor,Ind. Y1.. 5.375
Johnstown,Pa. B2 ..... 5.375
Joliet,Ill. A7 ..... 5.375
KansasCity,Mo. S5 .... 5.625
Kokomo,Ind. C16 ..... 5.475
LosAngeles B3 ..... 6.175
Minnequa,Colo. C10 ... 5.625
Monessen,Pa. P7 ..... 5.375
N.Tonawanda,N.Y. B11 5.375
Pittsburg,Calif. C11 ... 5.675
Portsmouth,O. P12 .... 5.375
Roebling,N.J. R5 ..... 5.475
S.Chicago,Ill. R2 ..... 5.375
SparrowsPoint,Md. B2.. 5.475
Sterling,Ill.(1) N15 .... 5.375
Sterling,Ill. N15 ..... 5.475
Struthers,O. Y1 ..... 5.375
Worcester,Mass. A7 ... 5.675

## STRUCTURALS

**Carbon Steel Std. Shapes**

Ala.City,Ala. R2 ..... 4.60
Aliquippa,Pa. J5 ..... 4.60
Bessemer,Ala. T2 ..... 4.60
Bethlehem,Pa. B2 ..... 4.65
Birmingham C15 ..... 5.10
Clairton,Pa. U5 ..... 4.60
Fairfield,Ala. T2 ..... 4.60
Fontana,Calif. K1 ..... 5.25
Gary,Ind. U5 ..... 4.60
Geneva,Utah C11 ..... 4.60
Houston S5 ..... 4.70
Ind.Harbor,Ind. I-2 .... 4.60
Johnstown,Pa. B2 ..... 4.65
KansasCity,Mo. S5 .... 4.70
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.30
Minnequa,Colo. C10 .... 4.90
Munhall,Pa. U5 ..... 4.60
Niles,Calif. P1 ..... 5.25
Portland,Oreg. O4 .... 5.35
Phoenixville,Pa. P4 .... 5.15
Seattle B3 ..... 5.35
S.Chicago U5, W14 .... 4.60
S.SanFrancisco B3 .... 5.25
Torrance,Calif. C11 .... 5.30
Weirton,W.Va. W6 .... 4.60

**Wide Flange**

Bethlehem,Pa. B2 ..... 4.65
Clairton,Pa. U5 ..... 4.60
Fontana,Calif. K1 ..... 5.40
Lackawanna,N.Y. B2 .. 4.65
Munhall,Pa. U5 ..... 4.60
Phoenixville,Pa. P4 .... 5.15
S.Chicago,Ill. U5 ..... 4.60

**Alloy Std. Shapes**

Clairton,Pa. U5 ..... 5.65
Fontana,Calif. K1 ..... 7.30
Gary,Ind. U5 ..... 5.65
Houston S5 ..... 5.75
Munhall,Pa. U5 ..... 5.65
S.Chicago,Ill. U5 ..... 5.65

**H.S., L.A. Std. Shapes**

Aliquippa,Pa. J5 ..... 6.75
Bessemer,Ala. T2 ..... 6.75
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.75
Fairfield,Ala. T2 ..... 6.75
Fontana,Calif. K1 ..... 7.40
Gary,Ind. U5 ..... 6.75
Geneva,Utah C11 ..... 6.75
Houston S5 ..... 6.85
Ind.Harbor,Ind. I-2, Y1.. 6.75
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. S5 .... 6.85
Lackawanna,N.Y. B2 .. 6.80
LosAngeles B3 ..... 7.45
Munhall,Pa. U5 ..... 6.75
Seattle B3 ..... 7.50
S.Chicago,Ill. U5, W14.. 6.75
S.SanFrancisco B3 .... 7.40
Struthers,O. Y1 ..... 6.75

**H.S., L.A. Wide Flange**

Bethlehem,Pa. B2 ..... 6.80
Lackawanna,N.Y. B2 .. 6.80
Munhall,Pa. U5 ..... 6.75
S.Chicago,Ill. U5 ..... 6.75

## PILING

**BEARING PILES**

Bethlehem,Pa. B2 ..... 4.65
Lackawanna,N.Y. B2 .. 4.65
Munhall,Pa. U5 ..... 4.60
S.Chicago,Ill. U5 ..... 4.60

**STEEL SHEET PILING**

Ind.Harbor,Ind. I-2 .... 5.45
Lackawanna,N.Y. B2 ... 5.45
Munhall,Pa. U5 ..... 5.45
S.Chicago,Ill. U5 ..... 5.45

## PLATES

**PLATES, Carbon Steel**

Ala.City,Ala. R2 ..... 4.50
Aliquippa,Pa. J5 ..... 4.50
Ashland,Ky.(15) A10 ... 4.50
Bessemer,Ala. T2 ..... 4.50
Bridgeport,Conn. N19 .. 4.75
Buffalo R2 ..... 4.50
Clairton,Pa. U5 ..... 4.50
Claymont,Del. C22 ..... 4.80
Cleveland J5, R2 ..... 4.60
Coatesville,Pa. L7 ..... 4.80
Conshohocken,Pa. A3 ... 4.50
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.60
Fairfield,Ala. T2 ..... 4.50
Fontana,Calif.(30) K1 .. 5.15
Gary,Ind. U5 ..... 4.50
Geneva,Utah C11 ..... 4.50
GraniteCity,Ill. G4 ..... 4.70
Harrisburg,Pa. P4 ..... 5.10
Houston S5 ..... 4.60
Ind.Harbor,Ind. I-2, Y1.. 4.50
Johnstown,Pa. B2 ..... 4.50
Lackawanna,N.Y. B2 ... 4.50
LoneStar,Tex. L6 ..... 4.85
Mansfield,O. E6 ..... 4.50
Minnequa,Colo. C10 .... 5.35
Munhall,Pa. U5 ..... 4.50
Newport,Ky. N9 ..... 4.50
Pittsburgh J5 ..... 4.50
Riverdale,Ill. A1 ..... 4.725
Seattle B3 ..... 5.40
Sharon,Pa. S3 ..... 4.50
S.Chicago R2, U5, W14.. 4.50
SparrowsPoint,Md. B2 .. 4.50
Steubenville,O. W10 .... 4.50
Warren,O. R2 ..... 4.50
Weirton,W.Va. W6 ..... 4.50
Youngstown R2, U5, Y1.. 4.50

**PLATES, Carbon Abras. Resist.**

Claymont,Del. C22 ..... 5.65
Fontana,Calif. K1 ..... 6.30
Geneva,Utah C11 ..... 5.65
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 .. 5.65

**PLATES, Wrought Iron**

Economy,Pa. B14 ..... 10.40

**PLATES, High-Strength Low-Alloy**

Aliquippa,Pa. J5 ..... 6.725
Bessemer,Ala. T2 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Cleveland J5, R2 ..... 6.725
Claymont,Del. C22 ..... 6.725
Coatesville,Pa. L7 ..... 7.025
Conshohocken,Pa. A3 .. 6.725
Ecorse,Mich. G5 ..... 6.825
Fairfield,Ala. T2 ..... 6.725
Fontana,Calif.(30) K1.. 7.375
Gary,Ind. U5 ..... 6.725
Geneva,Utah C11 ..... 6.725
Houston S5 ..... 6.825
Ind.Harbor,Ind. I-2, Y1.. 6.725
Johnstown,Pa. B2 ..... 6.725
Munhall,Pa. U5 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle B3 ..... 7.625
Sharon,Pa. S3 ..... 6.725
S.Chicago,Ill. U5, W14.. 6.725
SparrowsPoint,Md. B2.. 6.725
Youngstown U5, Y1 ... 6.725

**PLATES, Alloy**

Bridgeport,Conn. N19 ... 6.55
Claymont,Del. C22 ..... 6.30
Coatesville,Pa. L7 ..... 6.30
Fontana,Calif. K1 ..... 6.95
Gary,Ind. U5 ..... 6.30
Houston S5 ..... 6.40
Ind.Harbor,Ind. Y1 .... 6.30
Johnstown,Pa. B2 ..... 6.30
Munhall,Pa. U5 ..... 6.30
Newport,Ky. N9 ..... 6.30
Seattle B3 ..... 7.20
Sharon,Pa. S3 ..... 6.30
S.Chicago,Ill. U5, W14.. 6.30
SparrowsPoint,Md. B2 .. 6.30
Youngstown Y1 ..... 6.30

**FLOOR PLATES**

Cleveland J5 ..... 5.575
Conshohocken,Pa. A3 .. 5.575
Harrisburg,Pa. P4 .... 5.575
Ind.Harbor,Ind. I-2 ... 5.575
Munhall,Pa. U5 ..... 5.575
S.Chicago,Ill. U5 ..... 5.575

**PLATES, Ingot Iron**

Ashland c.l. (15) A10... 4.75
Ashland l.c.l. (15) A10.. 5.25
Cleveland c.l. R2 ..... 5.10
Warren,O. c.l. R2 ..... 5.10

## BARS

**BARS, Hot-Rolled Carbon**

Ala.City,Ala.(9) R2 .... 4.65
Aliquippa,Pa.(9) J5 .... 4.65
Alton,Ill. L1 ..... 4.85
Atlanta A11 ..... 4.85
Bessemer,Ala.(9) T2 .. 4.65
Birmingham C15 ..... 5.15
Bridgeport,Conn. N19 .. 4.80
Buffalo(9) R2 ..... 4.65
Canton,O.(9) R2 ..... 4.75
Clairton,Pa.(9) U5 .... 4.65
Cleveland(9) R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala.(9) T2 .... 4.65
FairlessHills,Pa.(9) U5.. 4.80
Fontana,Calif. K1 ..... 5.35
Gary,Ind.(9) U5 ..... 4.65
Houston(9) S5 ..... 4.90
Ind.Harbor,Ind.(9) I-2.. 4.65
Ind.Harbor,Ind. Y1 .... 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 5.15
KansasCity,Mo.(9) S5 .. 4.90
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.35
Massillon,O.(9) R2 .... 4.75
Midland,Pa. C18 ..... 4.65
Milton,Pa. M18 ..... 4.80
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... 5.35
N.T'wanda,N.Y.(9) B11 4.65
Pittsburg,Calif.(9) C11.. 5.35
Pittsburgh(9) J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
Seattle B3, N14 ..... 5.40
S.Chicago W14 ..... 4.65
S.Chicago,Ill.(9) R2, U5 4.65
S.Duquesne,Pa.(9) U5... 4.65
S.SanFran.,Calif. B3 .... 5.40
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif.(9) C11 .. 5.35
Warren,O.(9) R2 ..... 4.65
Weirton,W.Va.(9) W6 .... 4.65
Youngstown(9) R2 U5.4.65

**BARS, H.R. Leaded Alloy**

Warren,O. C17 ..... 6.325

**BARS, Hot-Rolled Alloy**

Bethlehem,Pa. B2 ..... 5.575
Bridgeport,Conn. N19.. 5.725
Buffalo R2 ..... 5.575
Canton,O. R2, T7 ..... 5.575
Clairton,Pa. U5 ..... 5.575
Detroit R7 ..... 5.575
Ecorse,Mich. G5 ..... 5.675
Fontana,Calif. K1 .... 6.625
FairlessHills,Pa. U5 .. 5.725
Gary,Ind. U5 ..... 5.575
Houston S5 ..... 5.825
Ind.Harbor,Ind. I-2, Y1.. 5.575
Johnstown,Pa. B2 ..... 5.575
KansasCity,Mo. S5 .... 5.825
Lackawanna,N.Y. B2 .. 5.575
LosAngeles B3 ..... 6.625
Massillon,O. R2 ..... 5.575
Midland,Pa. C18 ..... 5.575
S.Chicago R2, U5, W14.. 5.575
S.Duquesne,Pa. U5 .... 5.575
Struthers,O. Y1 ..... 5.575
Warren,O. C17 ..... 5.575
Youngstown U5 ..... 5.575

**BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy**

Aliquippa,Pa. J5 ..... 6.80
Bessemer,Ala. T2 ..... 6.80
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Cleveland R2 ..... 6.80
Ecorse,Mich. G5 ..... 6.90
Fairfield,Ala. T2 ..... 6.80
Fontana,Calif. K1 .... 7.50
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
Ind.Harb.,Ind. I-2, Y1.. 6.80
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. S5 .... 7.05
Lackawanna,N.Y. B2 .. 6.80
LosAngeles B3 ..... 7.50
Pittsburgh J5 ..... 6.80
Seattle B3 ..... 7.55
S.Chicago W14 ..... 6.80
S.Duquesne,Pa. U5 .... 6.80
S.SanFrancisco B3 .... 7.55
Struthers,O. Y1 ..... 6.80
Warren,O. R2 ..... 6.80
Youngstown U5 ..... 6.80

**BAR SIZE ANGLES; H.R. Carbon**

Bethlehem,Pa. B2 ..... 4.80

**BAR SIZE ANGLES; S. Shapes**

Aliquippa,Pa. J5 ..... 4.65
Atlanta A11 ..... 4.85
Fontana,Calif. K1 ..... 5.35
Joliet,Ill. P22 ..... 5.10
Niles,Calif. P1 ..... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
SanFrancisco S7 ..... 5.05

**BAR SHAPES, Hot-Rolled Alloy**

Clairton,Pa. U5 ..... 5.65
Gary,Ind. U5 ..... 5.65
Houston S5 ..... 5.90
KansasCity,Mo. S5 .... 5.90
Youngstown U5 ..... 5.65

**BARS, C.F. Leaded Alloy**

Ambridge,Pa. W18 .... 8.325
Camden,N.J. P13 ..... 8.35
Chicago W18 ..... 8.325
Cleveland C20 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
SpringCity,Pa. K3 .... 8.30
Warren,O. C17 ..... 8.325

**BARS, Cold-Finished Carbon**

Ambridge,Pa. W18 .... 6.25*
BeaverFalls,Pa. M12,R2 6.25*
Buffalo B5 ..... 6.30*
Camden,N.J. P13 ..... 6.70*
Carnegie,Pa. C12 ..... 6.25*
Chicago W18 ..... 6.25*
Cleveland A7, C20 .... 6.25*
Detroit B5 ..... 6.45*
Detroit P17, R7 ..... 6.25*
Donora,Pa. A7 ..... 6.25*
Elyria,O. W8 ..... 6.25*
FranklinPark,Ill. N5 .. 6.25*
Gary,Ind. R2 ..... 6.25*
GreenBay,Wis. F7 .... 6.25*
Hammond,Ind. L2, M13. 6.25*
Hartford,Conn. R2 .... 6.75*
Harvey,Ill. B5 ..... 6.25*
LosAngeles(49) S30 .... 7.70*
LosAngeles R2 ..... 7.70*
Mansfield,Mass. B5 ... 6.80*
Massillon,O. R2, R8 ... 6.25*
Midland,Pa. C18 ..... 6.25*
Monaca,Pa. S17 ..... 6.25*
Newark,N.J. W18 ..... 6.70*
NewCastle,Pa.(17) B4.. 6.25*
Pittsburgh J5 ..... 6.25*
Plymouth,Mich. P5 .... 6.50*
Putnam,Conn. W18 .... 6.80*
Readville,Mass. C14 ... 6.80*
S.Chicago,Ill. W14 .... 6.25*
SpringCity,Pa. W3 .... 6.70*
Struthers,O. Y1 ..... 6.25*
Waukegan,Ill. A7 ..... 6.25*
Worcester,Mass. W19 .. 6.70*
Youngstown F3, Y1 ... 6.25*

*Including 0.35c for special quality.

**BARS, Cold-Finished Carbon (Turned and Ground)**

Cumberland,Md.(5) C19. 5.16

**BARS, Cold-Finished Alloy**

Ambridge,Pa. W18 ... 7.425
BeaverFalls,Pa.M12,R2 7.425
Bethlehem,Pa. B2 ..... 7.425
Buffalo B5 ..... 7.425
Camden,N.J. P13 ..... 7.60
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 7.425
Chicago W18 ..... 7.425
Cleveland A7, C20 ..... 7.425
Detroit R7 ..... 7.425
Detroit B5, P17 ..... 7.625
Donora,Pa. A7 ..... 7.425
Elyria,O. W8 ..... 7.425
Gary,Ind. R2 ..... 7.425
GreenBay,Wis. F7 ..... 7.425
Hammond,Ind. L2, M13. 7.425
Hartford,Conn. R2 .... 7.725
Harvey,Ill. B5 ..... 7.425
Lackawanna,N.Y. B2 .. 7.425
LosAngeles S30 ..... 9.10
Mansfield,Mass. B5 ... 7.725
Massillon,O. R2, R8 ... 7.425
Midland,Pa. C18 ..... 7.425
Monaca,Pa. S17 ..... 7.425
Newark,N.J. W18 ..... 7.60
Plymouth,Mich. P5 .... 7.625
S.Chicago W14 ..... 7.425
SpringCity,Pa. K3 ..... 7.60
Struthers,O. Y1 ..... 7.425
Warren,O. C17 ..... 7.425
Waukegan,Ill. A7 ..... 7.425
Worcester,Mass. A7 ... 7.725
Youngstown F3, Y1 ... 7.425

**BARS, Reinforcing (To Fabricators)**

Ala.City,Ala. R2 ..... 4.65
Atlanta A11 ..... 4.85
Birmingham C15 ..... 5.15
Buffalo R2 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 ... 5.40
Fairfield,Ala. T2 ..... 4.65
FairlessHills,Pa. U5 .... 4.80
Fontana,Calif. K1 ..... 5.35
Ft.Worth,Tex.(42) T4 .. 5.10
Gary,Ind. U5 ..... 4.65
Houston S5 ..... 4.90

Ind.Harbor,Ind. I-2, Y1..4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.80
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.35
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SandSprings,Okla. S5 ...5.15
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne,Pa. U5 .....4.65
S.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5, Y1.4.65

**BARS, Reinforcing**
**(Fabricated; to Consumers)**

Johnstown,Pa. ¼-1" B2.6.15
KansasCity,Kans. S5 ...6.45
Lackawanna,N.Y. B2 ...6.17
Marion,O. P11 .....6.15
Pittsburgh U8 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ½-1" B2...6.15
Williamsport,Pa. S19 ...6.00

**RAIL STEEL BARS**

ChicagoHts.(3) C2, I-2..4.65
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4...5.10
Franklin,Pa.(3) F5 .....4.65
Franklin,Pa.(4) F5 .....4.65
JerseyShore,Pa.(4) J8 ..4.65
Marion,O.(3) P11 .....4.65
Moline,Ill.(3) R2 .....4.80
Tonawanda(3) B12 ....4.65
Tonawanda(4) B12 ....5.15
Williamsport,Pa.(3) S19.4.65

**BARS, Wrought Iron**

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14, 14.65
McK.Rks.(S.R.) L5 ..11.50
McK.Rks.(D.R.) L5 ..16.00
McK.Rks.(Staybolt) L5.17.00

# SHEETS

**SHEETS, Hot-Rolled Steel**
**(18 Gage and Heavier)**

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ..4.325
Cleveland J5, R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
FairlessHills,Pa. U5 ...4.375
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6 (37) ..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ....4.325
Niles,O. M21 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2 .4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ...4.325

**SHEETS, H.R. (19 Ga. & Lighter)**

Ala.City,Ala. R2 .....5.625
Niles,O. M21 .....5.325

**SHEETS, H.R. Alloy**

Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1 .....7.20

**SHEETS, H.R. (14 Ga. & Heavier)**
**High-Strength Low-Alloy**

Cleveland J5, R2 .....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ...6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 .....6.375
FairlessHills,Pa. U5 ..6.425
Fontana,Calif. K1 .....7.125
Gary,Ind. U5 .....6.375
Ind.Harbor,Ind. I-2, Y1..6.375
Lackawanna(35) B2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago,Ill. U5 .....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 .....6.375
Weirton,W.Va. W6 ....6.375
Youngstown U5, Y1 ...6.375

**SHEETS, Hot-Rolled Ingot Iron**
**(18 Gage and Heavier)**

Ashland,Ky.(8) A10 ...4.575
Ind.Harbor,Ind. I-2....4.575

**SHEETS, Cold-Rolled Steel**
**(Commercial Quality)**

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 .....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 .....5.425
Fairfield,Ala. T2 .....5.325
FairlessHills,Pa. U5 ..5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 .....6.425
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1.5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport, Ky. N9 .....5.325
Pittsburg,Calif. C11 ..6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10 ...5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

**SHEETS, Cold-Rolled**
**High-Strength Low-Alloy**

Cleveland J5, R2 .....7.875
Dravosburg,Pa. U5 ....7.875
Ecorse,Mich. G5 .....7.975
FairlessHills,Pa. U5 ...7.925
Fontana,Calif. K1 ....8.975
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 .....7.875
SparrowsPoint(38) B2..7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

**SHEETS, Cold-Rolled Ingot Iron**

Middletown,O. A10 ....5.825

| SHEETS, Culvert (16 Gage) | Cu Alloy | Cu Fe |
|---|---|---|
| Ashland,Ky. A10 | 6.90 | ... |
| Canton,O. R2 | 6.10 | 6.55 |
| Dravosburg U5 | 6.10 | ... |
| Fairfield T2 | 6.10 | ... |
| Gary,Ind. U5 | 6.10 | 6.35 |
| Ind.Harbor I-2 | 6.10 | 6.35 |
| Kokomo,Ind. C16 | 6.20 | ... |
| MartinsFry. W10 | 6.10 | ... |
| Newport,Ky. N9 | 6.10 | 6.35 |
| Pitts.,Calif. C11 | 6.85 | ... |
| SparrowsPt. B2 | 6.10 | ... |

**SHEETS, Culvert—Pure Iron**

Ashland,Ky. A10 .....7.15
Gary,Ind. U5 .....6.35
MartinsFry,O. W10 ....6.35

**SHEETS, Galvanized Steel**
**Hot-Dipped**

Ala.City,Ala. R2 .....5.85‡
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85‡
Dover,O. R1 .....5.85†
Dravosburg,Pa. U5 ...5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 .....5.95‡
MartinsFerry,O. W10 ...5.85*
Middletown,O. A10 ....5.85†
Newport,Ky. N9 .....5.85‡
Pittsburg,Calif. C11 ..6.60*
SparrowsPt.,Md. B2 ...5.85†
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ...5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

**SHEETS, Well Casing**

Fontana,Calif. K1 ....6.575

**SHEETS, Galvanized**
**High-Strength Low-Alloy**

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

**SHEETS, Galvannealed Steel**

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25

**SHEETS, Galvanized Ingot Iron**
**(Hot-dipped Continuous)**

Ashland,Ky. A10 .....6.10
Middletown,O. A10 ....6.10

**SHEETS, Electrogalvanized**

Cleveland(28) R2 .....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

**SHEETS, Aluminum Coated**

Butler,Pa. A10 (type 1).8.50
Butler,Pa. A10 (type 2).8.60

**SHEETS, Enameling Iron**

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. M21 .....5.90
Youngstown Y1 .....5.90

**BLUED STOCK, 29 Gage**

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ....7.75
Yorkville,O. W10 .....7.75

**SHEETS, Long Terne Steel**
**(Commercial Quality)**

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 .....6.25
Niles,O. M21 .....6.25
Weirton,W.Va. W6 ....6.25

**SHEETS, Long Terne, Ingot Iron**

Middletown,O. A10 ....6.65

## Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft.HowardSteel&Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel&Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel&WireCo.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md.Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel&Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel&Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 YoungstownSheet&Tube

## STRIP

**STRIP, Hot-Rolled Carbon**

| | |
|---|---|
| Ala.City,Ala.(27) R2 | .4.325 |
| Allenport,Pa. P7 | .4.325 |
| Alton,Ill. L1 | .4.50 |
| Ashland,Ky.(8) A10 | .4.325 |
| Atlanta A11 | .4.525 |
| Bessemer,Ala. T2 | .4.325 |
| Birmingham C15 | .4.825 |
| Bridgeport,Conn. N19 | .4.625 |
| Buffalo(27) R2 | .4.325 |
| Conshohocken,Pa. A3 | .4.375 |
| Detroit M1 | .4.425 |
| Ecorse,Mich. G5 | .4.425 |
| Fairfield,Ala. T2 | .4.325 |
| Fontana,Calif. K1 | .5.075 |
| Gary,Ind. U5 | .4.325 |
| Ind.Harbor,Ind. I-2, Y1 | .4.325 |
| Johnstown,Pa.(25) B2 | .4.325 |
| Lackaw'na,N.Y.(24) B2 | 4.325 |
| LosAngeles(25) B3 | .5.075 |
| Milton,Pa. M18 | .4.325 |
| Minnequa,Colo. C10 | .5.425 |
| Pittsburg,Calif. C11 | .5.075 |
| Portsmouth,O. P12 | .4.325 |
| Riverdale,Ill. A1 | .4.55 |
| SanFrancisco S7 | .5.05 |
| Seattle(25) B3 | .5.325 |
| Seattle N14 | .5.40 |
| Sharon,Pa. S3 | .4.325 |
| S.Chicago,Ill. W14 | .4.325 |
| S.SanFrancisco(25) B3 | .5.075 |
| SparrowsPoint,Md. B2 | .4.325 |
| Sterling(1) N15 | .4.325 |
| Sterling,Ill. N15 | .4.425 |
| Torrance,Calif. C11 | .5.075 |
| Warren,O. R2 | .4.325 |
| Weirton,W.Va. W6 | .4.325 |
| Youngstown U5 | .4.325 |

**STRIP, Hot-Rolled Alloy**

| | |
|---|---|
| Bridgeport,Conn. N19 | .7.50 |
| Carnegie,Pa. S18 | .7.20 |
| Fontana,Calif. K1 | .8.85 |
| Gary,Ind. U5 | .7.20 |
| Ind.Harbor,Ind. Y1 | .7.20 |
| LosAngeles B3 | .8.40 |
| Newport,Ky. N9 | .7.20 |
| Sharon,Pa. S3 | .7.20 |
| S.Chicago W14 | .7.20 |
| Youngstown U5, Y1 | .7.20 |

**STRIP, Hot-Rolled High-Strength Low-Alloy**

| | |
|---|---|
| Bessemer,Ala. T2 | .6.425 |
| Conshohocken,Pa. A3 | .6.425 |
| Ecorse,Mich. G5 | .6.525 |
| Fairfield,Ala. T2 | .6.425 |
| Fontana,Calif. K1 | .7.525 |
| Gary,Ind. U5 | .6.425 |
| Houston S5 | .6.675 |
| Ind.Harbor,Ind. I-2, Y1 | .6.425 |
| KansasCity,Mo. S5 | .6.675 |
| Lackawanna,N.Y. B2 | .6.425 |
| LosAngeles(25) B3 | .7.175 |
| Seattle(25) B3 | .7.425 |
| Sharon,Pa. S3 | .6.425 |
| S.SanFrancisco(25) B3 | .7.175 |
| SparrowsPoint,Md. B2 | .6.425 |
| Warren,O. R2 | .6.425 |
| Weirton,W.Va. W6 | .6.425 |
| Youngstown U5, Y1 | .6.425 |

**STRIP, Hot-Rolled Ingot Iron**

| | |
|---|---|
| Ashland,Ky.(8) A10 | .4.575 |

**STRIP, Cold-Rolled Carbon**

| | |
|---|---|
| Anderson,Ind. G6 | .6.25 |
| Baltimore T6 | .6.25 |
| Boston T6 | .6.80 |
| Buffalo S40 | .6.25 |
| Cleveland A7, J5 | .6.25 |
| Conshohocken,Pa. A3 | .6.30 |
| Dearborn,Mich. D3 | .6.35 |
| Detroit D2, M1, P20 | .6.35 |
| Dover,O. G6 | .6.25 |
| Ecorse,Mich. G5 | .6.35 |
| Follansbee,W.Va. F4 | .6.25 |
| Fontana,Calif. K1 | .8.00 |
| FranklinPark,Ill. T6 | .6.35 |
| Ind.Harbor,Ind. I-2 | .6.35 |
| Ind.Harbor,Ind. Y1 | .6.25 |
| Indianapolis C8 | .6.40 |
| Lackawanna,N.Y. B2 | .6.25 |
| LosAngeles C1 | .8.30 |
| NewBedford,Mass. R10 | .6.70 |
| NewBritain(10) S15 | .6.25 |
| NewCastle,Pa. B4, E5 | .6.25 |
| NewHaven,Conn. A7, D2 | 6.70 |
| NewKensington,Pa. A6 | .6.25 |
| Pawtucket,R.I. R3 | .6.90 |
| Pawtucket,R.I. N8 | .6.80 |
| Pittsburgh J5 | .6.25 |
| Riverdale,Ill. A1 | .6.35 |
| Rome,N.Y.(32) R6 | .6.25 |
| Sharon,Pa. S3 | .6.25 |
| SparrowsPt.,Md. B2 | .6.25 |
| Trenton,N.J.(31) R5 | .7.80 |
| Wallingford,Conn. W2 | .6.70 |
| Warren,O. R2, T5 | .6.25 |
| Weirton,W.Va. W6 | .6.25 |
| Worcester,Mass. A7 | .6.80 |
| Youngstown C8, Y1 | .6.25 |

**STRIP, Cold-Rolled Alloy**

| | |
|---|---|
| Boston T6 | .13.80 |
| Carnegie,Pa. S18 | .13.45 |
| Cleveland A7 | .13.45 |
| Dover,O. G6 | .13.45 |
| FranklinPark,Ill. T6 | .13.45 |
| Harrison,N.J. C18 | .13.45 |
| Indianapolis C8 | .13.60 |
| Pawtucket,R.I. N8 | .13.80 |
| Sharon,Pa. S3 | .13.45 |
| Worcester,Mass. A7 | .13.75 |
| Youngstown C8 | .13.45 |

**STRIP, Cold-Rolled High-Strength Low-Alloy**

| | |
|---|---|
| Cleveland A7 | .9.10 |
| Dearborn,Mich. D3 | .9.20 |
| Dover,O. G6 | .9.30 |
| Ecorse,Mich. G5 | .9.20 |
| Ind.Harbor,Ind. Y1 | .9.30 |

**STRIP, Cold-Finished Spring Steel (Annealed)**

| | 0.26-0.40C | 0.41-0.60C | 0.61-0.80C | 0.81-1.05C | 1.06-1.35C |
|---|---|---|---|---|---|
| Baltimore T6 | 7.40 | 9.35 | 10.90 | 13.05 | 15.75 |
| Boston T6 | 7.65 | 9.35 | 10.90 | 13.05 | 15.75 |
| Bristol,Conn. W1 | ... | ... | 10.80 | 12.95 | 15.65 |
| Carnegie,Pa. S18 | ... | 9.05 | 10.60 | 12.75 | .... |
| Cleveland A7 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Cleveland C7 | ... | 9.05 | 10.60 | 12.75 | 15.45 |
| Dearborn,Mich. D3 | 7.20 | 9.15 | 10.70 | .... | .... |
| Detroit D2 | 7.20 | 9.15 | 10.70 | 12.85 | .... |
| Dover,O. G6 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| FranklinPark,Ill. T6 | 7.20 | 9.05 | 10.60 | 12.75 | 15.45 |
| Harrison,N.J. C18 | ... | ... | 10.90 | 13.05 | 15.75 |
| Indianapolis C8 | 7.25 | 9.20 | 10.60 | 12.75 | 15.45 |
| NewBritain,Conn.(10) S15 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| NewCastle,Pa. B4, E5 | 7.10 | 9.05 | 10.60 | 12.75 | .... |
| NewHaven,Conn. D2 | 7.55 | 9.35 | 10.90 | 13.05 | .... |
| NewKensington,Pa. A6 | 7.10 | 9.05 | 10.60 | .... | .... |
| NewYork W3 | ... | 9.35 | 10.90 | 13.05 | 15.75 |
| Pawtucket,R.I. N8 | 7.65 | 9.35 | 10.90 | 13.05 | 15.75 |
| Riverdale,Ill. A1 | 7.20 | 9.05 | 10.60 | 12.75 | 15.45 |
| Rome,N.Y.(32) R6 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Sharon,Pa. S3 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Trenton,N.J. R5 | ... | 9.35 | 10.90 | 13.05 | 15.75 |
| Wallingford,Conn. W2 | 7.55 | 9.35 | 10.90 | 13.05 | 15.75 |
| Warren,O. T5 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Weirton,W.Va. W6 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Worcester,Mass. A7, T6 | 7.65 | 9.35 | 10.90 | 13.05 | 15.75 |
| Youngstown C8 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| **Spring Steel (Tempered)** | | | | | |
| Bristol,Conn. W1 | ... | ... | 14.40 | 17.60 | .... |
| Buffalo W12 | ... | ... | 14.40 | .... | .... |
| FranklinPark,Ill. T6 | ... | ... | 14.90 | 18.10 | 21.50 |
| Harrison,N.J. C18 | ... | ... | 14.40 | 17.60 | 21.00 |
| NewYork W3 | ... | ... | 14.40 | 17.60 | 21.00 |
| Trenton,N.J. R5 | ... | ... | 14.40 | 17.60 | 21.00 |
| Worcester,Mass. W12 | ... | ... | 14.40 | .... | .... |
| Worcester,Mass. A7, T6 | ... | ... | 14.40 | 17.60 | 21.00 |
| Youngstown C8 | ... | ... | 15.00 | 18.35 | 22.35 |

## SILICON STEEL

| H.R. SHEETS(22 Ga., cut lengths) | Field | Armature | Electric | Motor | Dynamo |
|---|---|---|---|---|---|
| BeechBottom,W.Va. W10 | ... | ... | 9.95 | 10.95 | 11.85 |
| Brackenridge,Pa. A4 | ... | ... | 9.95 | 10.95 | 11.85 |
| Mansfield,O. E6 | 8.40 | 9.35 | 9.95 | 10.95 | 11.85 |
| Newport,Ky. N9 | 8.40 | 9.35 | 9.95 | 10.95 | 11.85 |
| Niles,O. M21 | 8.40 | 9.35 | 9.95 | 10.95 | .... |
| Vandergrift,Pa. U5 | ... | 9.35 | 9.95 | 10.95 | 11.85 |
| Warren,O. R2 | 8.40 | 9.35 | 9.95 | 10.95 | 11.85 |
| Zanesville,O. A10 | ... | 9.35 | 9.95 | 10.95 | 11.85 |

**C.R. COILS & CUT LENGTHS, (22 Ga.)**

| Fully Processed (Semiprocessed ½c lower) | Field | Armature | Electric | Motor | Dynamo |
|---|---|---|---|---|---|
| Brackenridge,Pa. A4 | ... | ... | 10.70 | 11.70 | 12.60 |
| GraniteCity,Ill. G4 | 8.80* | 9.80* | 10.40* | 11.40* | .... |
| IndianaHarbor,Ind. I-2 | 8.60† | 9.60* | 10.20* | 11.20* | .... |
| Vandergrift,Pa. U5 | ... | 10.10† | 10.70† | 11.70† | 12.60† |
| Vandergrift,Pa. U5 | 8.60* | 9.60* | 10.20* | 11.20* | 12.10* |
| Warren,O. R2 | 8.60† | 10.10 | 10.70 | 11.70 | 12.60 |

| | Transformer Grade | | | |
|---|---|---|---|---|
| H.R. SHEETS (22 Ga., cut lengths) | T-72 | T-65 | T-58 | T-52 |
| BeechBottom,W.Va. W10 | 12.80 | 13.35 | 13.85 | 14.85 |
| Brackenridge,Pa. A4 | 12.80 | .... | .... | .... |
| Newport,Ky. N9 | 12.80 | .... | .... | .... |
| Vandergrift,Pa. U5 | 12.80 | 13.35 | 13.85 | 14.85 |
| Zanesville,O. A10 | 12.80‡ | 13.35‡ | 13.85‡ | 14.85‡ |

| | Grain Oriented | | | | | |
|---|---|---|---|---|---|---|
| C.R. COILS & CUT LENGTHS (22 Ga.) | T-100 | T-90 | T-80 | T-73 | T-66 | T-72 |
| Brackenridge,Pa. A4 | .... | 15.85 | 17.45 | 17.95 | 18.45 | 13.55** |
| Butler,Pa. A10 | .... | .... | 17.45 | 17.95 | .... | .... |
| Vandergrift,Pa. U5 | 14.85 | 15.85 | 17.45 | 17.95 | .... | 13.55 |
| Warren,O. R2 | .... | .... | .... | .... | .... | 13.55‡ |

*Semiprocessed. †Fully processed only. ‡Coils, annealed. semiprocessed ½c lower. §Coils, ¾-cent higher. **Cut lengths, ¾-cent lower.

*Plus galvanizing extras.

**STRIP, Galvanized (Continuous)**

| | |
|---|---|
| Sharon,Pa. S3 | .6.55 |

**TIGHT COOPERAGE HOOP**

| | |
|---|---|
| Atlanta A11 | .5.05 |
| Riverdale,Ill. A1 | .4.90 |
| Sharon,Pa. S3 | .4.75 |
| Youngstown U5 | .4.75 |

**STRIP, Electrogalvanized**

| | |
|---|---|
| Cleveland A7 | .6.25* |
| Dover,O. G6 | .6.25* |
| Riverdale,Ill. A1 | .6.35* |
| Youngstown C8 | .6.25* |
| Warren,O. T5 | .6.25* |
| Warren,O. B9 | .6.45* |
| Weirton,W.Va. W6 | .5.75* |
| Worcester,Mass. A7 | .6.80* |

## TIN MILL PRODUCTS

| TIN PLATE Electrolytic (Base Box) | 0.25 lb | 0.50 lb | 0.75 lb |
|---|---|---|---|
| Aliquippa,Pa. J5 | $7.90 | $8.15 | $8.55 |
| Dravosburg,Pa. U5 | 7.90 | 8.15 | 8.55 |
| Fairfield,Ala. T2 | 8.00 | 8.25 | 8.65 |
| FairlessHills,Pa. U5 | 8.00 | 8.25 | 8.65 |
| Gary,Ind. U5 | 7.90 | 8.15 | 8.55 |
| GraniteCity,Ill. G4 | 8.00 | 8.25 | 8.65 |
| IndianaHarbor,Ind. I-2, Y1 | 7.90 | 8.15 | 8.55 |
| Niles,O. R2 | 7.90 | 8.15 | 8.55 |
| Pittsburg,Calif. C11 | 8.65 | 8.90 | 9.30 |
| SparrowsPoint,Md. B2 | 8.00 | 8.25 | 8.65 |
| Weirton,W.Va. W6 | 7.90 | 8.15 | 8.55 |
| Yorkville,O. W10 | 7.90 | 8.15 | 8.55 |

**ELECTROTIN (22-27 Gage; Dollars per 100 lb)**

| | | | |
|---|---|---|---|
| Aliquippa,Pa. J5 | 6.675 | .... | .... |
| Niles,O. R2 | 6.675 | 6.875 | 7.075 |

| TINPLATE, American Coke (Base Box) | 1.25 lb | 1.50 lb |
|---|---|---|
| Aliquippa,Pa. J5 | $9.20 | $9.45 |
| Dravosburg,Pa.U5 | 9.20 | 9.45 |
| Fairfield,Ala. T2 | 9.30 | 9.55 |
| Fairless,Pa. U5 | 9.30 | 9.55 |
| Gary,Ind. U5 | 9.20 | 9.45 |
| Ind.Har. I-2, Y1 | 9.20 | 9.45 |
| Pitts.,Calif. C11 | 9.95 | 10.20 |
| Sp.Pt.,Md. B2 | 9.30 | 9.55 |
| Weirton,W.Va. W6 | 9.20 | 9.45 |
| Yorkville,O. W10 | 9.20 | 9.45 |

**BLACK PLATE (Base Box)**

| | |
|---|---|
| Aliquippa,Pa. J5 | $7.00 |
| Dravosburg,Pa. U5 | 7.00 |
| Fairfield,Ala. T2 | 7.10 |
| FairlessHills,Pa. U5 | 7.10 |
| Gary,Ind. U5 | 7.00 |
| GraniteCity,Ill. G4 | 7.10 |
| Ind.Harbor,Ind. I-2, Y1 | 7.00 |
| Niles,O. R2 | 7.00 |
| Pittsburg,Calif. C11 | 7.75 |
| SparrowsPoint,Md. B2 | 7.10 |
| Warren,O. R2 | 7.00 |
| Weirton,W.Va. W6 | 7.00 |
| Yorkville,O. W10 | 7.00 |

**HOLLOWARE ENAMELING Black Plate (29 Gage)**

| | |
|---|---|
| Dravosburg,Pa. U5 | 6.65 |
| Gary,Ind. U5 | 6.65 |
| GraniteCity,Ill. G4 | 6.75 |
| Ind.Harbor,Ind. Y1 | 6.65 |
| Yorkville,O. W10 | 6.65 |

**MANUFACTURING TERNES (Special Coated; Base Box)**

| | |
|---|---|
| Dravosburg,Pa. U5 | $8.70 |
| Gary,Ind. U5 | 8.70 |
| Yorkville,O. W10 | 8.70 |

**MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)**

| | |
|---|---|
| Yorkville,O. W10 | $9.15 |

**ROOFING SHORT TERNES (8 lb Coated; Base Box)**

| | |
|---|---|
| Gary,Ind. U5 | $10.25 |

## WIRE

**WIRE, Manufacturers Bright, Low Carbon**

| | |
|---|---|
| AlabamaCity,Ala. R2 | .6.60 |
| Aliquippa,Pa. J5 | .6.60 |
| Alton,Ill. L1 | .6.775 |
| Atlanta A11 | .6.80 |
| Bartonville,Ill. K4 | .6.35 |
| Buffalo W12 | .6.60 |
| Chicago W13 | .6.60 |
| Cleveland A7 | .6.60 |
| Crawfordsville,Ind. M8 | .6.70 |
| Donora,Pa. A7 | .6.60 |
| Duluth,Minn. A7 | .6.60 |
| Fairfield,Ala. T2 | .6.60 |
| Fostoria,O.(24) S1 | .6.80 |
| Houston S5 | .6.85 |
| Jacksonville,Fla. M8 | .6.95 |
| Johnstown,Pa. B2 | .6.60 |
| Joliet,Ill. A7 | .6.60 |
| KansasCity,Mo. S5 | .6.85 |
| Kokomo,Ind. C16 | .6.70 |
| LosAngeles B3 | .7.55 |
| Minnequa,Colo. C10 | .6.85 |
| Monessen,Pa. P7 | .6.60 |
| Newark 6-8 ga. I-1 | .6.90 |
| N.Tonawanda B11 | .6.60 |
| Palmer,Mass. W12 | .6.90 |
| Pittsburg,Calif. C11 | .7.20 |
| Portsmouth,O. P12 | .6.60 |
| Rankin,Pa. A7 | .6.60 |
| S.Chicago,Ill. R2 | .6.60 |
| S.SanFrancisco C10 | .7.55 |
| SparrowsPoint,Md. B2 | .6.70 |
| Sterling,Ill.(1) N15 | .6.60 |
| Sterling,Ill. N15 | .6.70 |
| Struthers,O. Y1 | .6.60 |
| Waukegan,Ill. A7 | .6.60 |
| Worcester,Mass. A7 | .6.90 |

**WIRE, MB Spring, High Carbon**

| | |
|---|---|
| Aliquippa,Pa. J5 | .7.90 |
| Alton,Ill. L1 | .8.075 |
| Bartonville,Ill. K4 | .8.00 |
| Buffalo W12 | .7.90 |
| Cleveland A7 | .7.90 |
| Donora,Pa. A7 | .7.90 |
| Duluth,Minn. A7 | .7.90 |
| Fostoria,O. S1 | .7.95 |
| Johnstown,Pa. B2 | .7.90 |
| LosAngeles B3 | .8.85 |
| Milbury,Mass.(12) N6 | .8.20 |
| Minnequa,Colo. C10 | .8.15 |
| Monessen,Pa. P16 | .7.90 |
| Muncie,Ind. I-7 | .8.10 |
| Palmer,Mass. W12 | .8.20 |
| Pittsburg,Calif. C11 | .8.85 |
| Portsmouth,O. P12 | .7.90 |
| Roebling,N.J. R5 | .8.20 |
| S.Chicago,Ill. R2 | .7.90 |
| S.SanFrancisco C10 | .8.85 |
| SparrowsPt.,Md. B2 | .8.00 |
| Struthers,O. Y1 | .7.90 |
| Trenton,N.J. A7 | .8.20 |
| Waukegan,Ill. A7 | .7.90 |
| Worcester A7,J4,T6,W12 | .8.20 |

**WIRE, Upholstery Spring**

| | |
|---|---|
| Aliquippa,Pa. J5 | .7.60 |
| Alton,Ill. L1 | .7.775 |
| Buffalo W12 | .7.60 |
| Cleveland A7 | .7.60 |
| Donora,Pa. A7 | .7.60 |
| Duluth,Minn. A7 | .7.60 |
| Johnstown,Pa. B2 | .7.60 |
| KansasCity,Mo. S5 | .7.85 |
| LosAngeles B3 | .8.55 |
| Minnequa,Colo. C10 | .7.775 |
| Monessen,Pa. P16 | .7.60 |
| NewHaven,Conn. A7 | .7.90 |
| Palmer,Mass. W12 | .7.90 |
| Pittsburg,Calif. C11 | .8.55 |
| Portsmouth,O. P12 | .7.60 |
| Roebling,N.J. R5 | .7.90 |
| S.Chicago,Ill. R2 | .7.60 |
| S.SanFrancisco C10 | .8.55 |
| SparrowsPoint,Md. B2 | .7.70 |
| Struthers,O. Y1 | .7.60 |
| Trenton,N.J. A7 | .7.90 |
| Waukegan,Ill. A7 | .7.60 |
| Worcester,Mass. A7 | .7.90 |

**WIRE, Fine & Weaving (8"Coils)**

| | |
|---|---|
| Alton,Ill. L1 | .12.725 |
| Bartonville,Ill. K4 | .12.65 |
| Buffalo W12 | .12.55 |
| Chicago W13 | .12.55 |
| Cleveland A7 | .12.55 |
| Crawfordsville,Ind. M8 | .12.65 |
| Fostoria,O. S1 | .12.55 |
| Jacksonville,Fla. M8 | .12.90 |
| Johnstown,Pa. B2 | .12.55 |
| Kokomo,Ind. C16 | .12.55 |
| Minnequa,Colo. C10 | .12.30 |
| Monessen,Pa. P6 | .12.55 |
| Muncie,Ind. I-7 | .12.75 |
| Palmer,Mass. W12 | .12.85 |
| Roebling,N.J. R5 | .12.85 |
| S.SanFrancisco C10 | .12.90 |
| Waukegan,Ill. A7 | .12.55 |
| Worcester,Mass. A7,T6 | .12.85 |

**WIRE, Gal'd ACSR for Cores**

| | |
|---|---|
| Bartonville,Ill. K4 | .10.70 |
| Buffalo W12 | .10.70 |
| Johnstown,Pa. B2 | .10.70 |
| Minnequa,Colo. C10 | .10.825 |
| Monessen,Pa. P16 | .10.70 |
| Muncie,Ind. I-7 | .10.90 |
| Pittsburg,Calif. C11 | .11.50 |
| Portsmouth,O. P12 | .10.70 |
| Roebling,N.J. R5 | .11.00 |
| SparrowsPt.,Md. B2 | .10.80 |
| Struthers,O. Y1 | .10.70 |

**ROPE WIRE (A)**

| | |
|---|---|
| Bartonville,Ill. K4 | .10.55 |
| Buffalo W12 | .10.55 |
| Fostoria,O. S1 | .10.55 |
| Johnstown,Pa. B2 | .10.55 |
| Monessen,Pa. P16 | .10.55 |
| Muncie,Ind. I-7 | .10.75 |
| Palmer,Mass. W12 | .10.85 |
| Portsmouth,O. P12 | .10.55 |
| Roebling,N.J. R5 | .10.85 |
| SparrowsPt. B2 | .10.65 |
| Struthers,O. Y1 | .10.55 |
| Worcester,Mass. J4 | .10.85 |

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

## WIRE

(Continued)

**WIRE, Tire Bead**

| | |
|---|---|
| Bartonville,Ill. K4 | ....14.15 |
| Monessen,Pa. P16 | ....14.20 |
| Roebling,N.J. R5 | ....14.35 |

**WIRE, Cold-Rolled Flat**

| | |
|---|---|
| Anderson,Ind. G6 | .....9.00 |
| Baltimore T6 | .....9.30 |
| Buffalo W12 | .....9.00 |
| Cleveland A7 | .....9.00 |
| Crawfordsville,Ind. M8 | ..9.00 |
| Dover,O. G6 | .....9.00 |
| Fostoria,O. S1 | .....9.00 |
| FranklinPark,Ill. T6 | ....9.10 |
| Kokomo,Ind. C16 | .....9.00 |
| Massillon,O. R8 | .....9.00 |
| Milwaukee C23 | .....9.20 |
| Monessen,Pa. P16 | .....9.00 |
| Pawtucket,R.I. N8 | ....9.30 |
| Riverdale,Ill. A1 | .....9.10 |
| Rome,N.Y. R6 | .....9.00 |
| Trenton,N.J. R5 | .....9.30 |
| Worcester A7, T6, W12 | ..9.30 |

**NAIL, Stock**

| To Dealers & Mfrs. (7) | Col. |
|---|---|
| AlabamaCity,Ala. R2 | ...152 |
| Aliquippa,Pa. J5 | .....152 |
| Atlanta A11 | .....154 |
| Bartonville,Ill. K4 | .....154 |
| Chicago,Ill. W13 | .....152 |
| Cleveland A9 | .....157 |
| Crawfordsville,Ind. M8 | ..154 |
| Donora,Pa. A7 | .....152 |
| Duluth,Minn. A7 | .....152 |
| Fairfield,Ala. T2 | .....152 |
| Galveston,Tex. D7 | .....157 |
| Houston,Tex. S5 | .....157 |
| Jack'ville,Fla.(23) M8 | ..162 |
| Johnstown,Pa. B2 | .....152 |
| Joliet,Ill. A7 | .....152 |
| KansasCity,Mo. S5 | .....157 |
| Kokomo,Ind. C16 | .....154 |
| Minnequa,Colo. C10 | ....157 |
| Monessen,Pa. P7 | .....152 |
| Pittsburg,Calif. C11 | ....171 |
| Rankin,Pa. A7 | .....152 |
| S.Chicago,Ill. R2 | .....152 |
| SparrowsPt.,Md. B2 | ....154 |
| Sterling,Ill.(1) N15 | ....152 |
| Worcester,Mass. A7 | ....158 |

**NAILS, CUT (100 lb keg)**

| To Dealers (33) | |
|---|---|
| Conshohocken,Pa. A3 | ..$9.05 |
| Wheeling,W.Va. W10 | ...9.05 |

**STAPLES, Polished Stock**

| To Dealers & Mfrs. (7) | Col. |
|---|---|
| Aliquippa,Pa. J5 | .....152 |
| Atlanta A11 | .....154 |
| Bartonville,Ill. K4 | .....154 |
| Crawfordsville,Ind. M8 | ..154 |
| Donora,Pa. A7 | .....152 |
| Duluth,Minn. A7 | .....152 |
| Fairfield,Ala. T2 | .....152 |
| Jack'ville,Fla.(23) M8 | ..162 |
| Johnstown,Pa. B2 | .....152 |
| Joliet,Ill. A7 | .....152 |
| Kokomo,Ind. C16 | .....154 |
| Minnequa,Colo. C10 | ....157 |
| Monessen,Pa. P7 | .....152 |
| Pittsburg,Calif. C11 | ....171 |
| Rankin,Pa. A7 | .....152 |
| SparrowsPt.,Md. B2 | ....154 |
| Sterling,Ill.(1) N15 | ....152 |
| Worcester,Mass. A7 | ....158 |

**TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)**

| Coil No. 3150 | |
|---|---|
| AlabamaCity,Ala. R2 | ..$9.35 |
| Bartonville,Ill. K4 | ....9.45 |
| Buffalo W12 | .....9.35 |
| Crawfordsville,Ind. M8 | ..9.45 |
| Donora,Pa. A7 | .....9.35 |
| Duluth,Minn. A7 | .....9.35 |
| Jacksonville,Fla. M8 | ....9.88 |
| Johnstown,Pa. B2 | .....9.35 |
| Joliet,Ill. A7 | .....9.35 |
| Kokomo,Ind. C16 | .....9.45 |
| LosAngeles B3 | .....10.14 |
| Minnequa,Colo. C10 | ....9.60 |
| Pittsburg,Calif. C11 | ....10.13 |
| S.Chicago,Ill. R2 | .....9.35 |
| SparrowsPt.,Md. B2 | ....9.45 |
| Sterling,Ill. N15 | .....9.35 |

| Coil No. 6500 Stand. | |
|---|---|
| AlabamaCity,Ala. R2 | ..$9.65 |
| Bartonville,Ill. K4 | ....9.75 |
| Buffalo W12 | .....9.65 |
| Crawfordsville,Ind. M8 | ..9.75 |
| Donora,Pa. A7 | .....9.65 |
| Duluth,Minn. A7 | .....9.65 |
| Jacksonville,Fla. M8 | ....10.18 |
| Johnstown,Pa. B3 | .....9.65 |
| Joliet,Ill. A7 | .....9.65 |
| Kokomo,Ind. C16 | .....9.75 |
| LosAngeles B3 | .....10.45 |
| Minnequa,Colo. C10 | ....9.90 |
| Pittsburg,Calif. C11 | ....10.45 |
| S.Chicago,Ill. R2 | .....9.65 |
| SparrowsPt.,Md. B2 | ....9.75 |
| Sterling,Ill. N15 | .....9.65 |

| Coil No. 6500 Interim | |
|---|---|
| AlabamaCity,Ala. R2 | ..$9.70 |
| Bartonville,Ill. K4 | .....9.80 |
| Buffalo W12 | .....9.70 |
| Crawfordsville,Ind. M8 | ..9.80 |
| Donora,Pa. A7 | .....9.70 |
| Duluth,Minn. A7 | .....9.70 |
| Jacksonville,Fla. M8 | ....10.23 |
| Johnstown,Pa. B2 | .....9.70 |
| Joliet,Ill. A7 | .....9.70 |
| Kokomo,Ind. C16 | .....9.80 |
| LosAngeles B3 | .....10.50 |
| Minnequa,Colo. C10 | ....9.95 |
| Pittsburg,Calif. C11 | ..10.50 |
| S.Chicago,Ill. R2 | .....9.70 |
| SparrowsPt.,Md. B2 | ....9.80 |
| Sterling,Ill. N15 | .....9.70 |

**WIRE, Barbed**

| | Col. |
|---|---|
| AlabamaCity,Ala. R2 | ..175** |
| Aliquippa,Pa. J5 | .....172§ |
| Atlanta A11 | .....181 |
| Bartonville,Ill. K4 | .....181 |
| Crawfordsville,Ind. M8 | ..181 |
| Donora,Pa. A7 | .....175† |
| Duluth,Minn. A7 | .....175† |
| Fairfield,Ala. T2 | .....175† |
| Houston,Tex. S5 | .....180** |
| Jacksonville,Fla. M8 | ...186 |
| Johnstown,Pa. B2 | ....179* |
| Joliet,Ill. A7 | .....175† |
| KansasCity,Mo. S5 | ....180** |
| Kokomo,Ind. C16 | ....177† |
| Minnequa,Colo. C10 | ..180** |
| Monessen,Pa. P7 | ....178†† |
| Pittsburg,Calif. C11 | ...195† |
| Rankin,Pa. A7 | .....175† |
| S.Chicago,Ill. R2 | ....175** |
| S.SanFrancisco C10 | ...195** |
| SparrowsPoint,Md. B2 | ..181* |
| Sterling,Ill.(1) N15 | ...179†† |

**WOVEN Fence, 9-15 ga.**

| | Col. |
|---|---|
| Ala.City,Ala. R2 | ....162** |
| Ala.City, 17 ga. R2 | ...257** |
| Ala.City, 18 ga. R2 | ...267** |
| Aliq'ppa,Pa.9-14½ga J5 | 165§ |
| Atlanta A11 | .....168 |
| Bartonville,Ill. K4 | .....168 |
| Crawfordsville,Ind. M8 | ..168 |
| Donora,Pa. A7 | .....162† |
| Duluth,Minn. A7 | .....162† |
| Fairfield,Ala. T2 | .....162† |
| Houston,Tex. S5 | ....167** |
| Jacksonville,Fla. M8 | ....173 |
| Johnstown,Pa.(43) B2 | ..166 |
| Joliet,Ill. A7 | .....162† |
| KansasCity,Mo. S5 | ....167** |
| Kokomo,Ind. C16 | .....164† |
| Minnequa,Colo. C10 | ....167** |
| Monessen,Pa. 9 ga. P17 | 166†† |
| Pittsburg,Calif. C11 | ...185† |
| Rankin,Pa. A7 | .....162† |
| S.Chicago,Ill. R2 | ....162** |
| Sterling,Ill.(1) N15 | ...166†† |

| WIRE (16 Gage) | An'ld Galv. Stone | Stone |
|---|---|---|
| Ala.City R2 | ...14.50 | 16.05** |
| Bartonville K4 | ..14.50 | 16.55 |
| Buffalo W12 | ....14.50 | .... |
| Cleveland A7 | ....14.50 | .... |
| Crawf'dsville M8 | 14.60 | 16.55 |
| Fostoria,O. S1 | ..14.60 | 16.15† |
| Jacksonville M8 | ..14.85 | 16.80 |
| Johnstown B2 | ..14.50 | 16.40* |
| Kokomo C16 | ...14.60 | 16.15† |
| Minnequa C10 | ..14.75 | 16.45** |
| Palmer,MassW12 | 14.50 | 16.05* |
| Pitts.,Calif. C11 | 14.85 | 16.40† |
| S.Chicago R2 | ..14.50 | 16.05** |
| SparrowsPt. B2 | 14.60 | 16.50* |
| Sterling(1) N15 | 14.50 | 16.45†† |
| Waukegan A7 | ..14.50 | 16.05† |
| Worcester A7 | ...14.80 | .... |

| WIRE, Merchant Quality (6 to 8 gage) | An'ld Galv. |
|---|---|
| Ala.City,Ala. R2 | 7.40 7.80** |
| Aliquippa J5 | ....7.40 7.925§ |
| Atlanta A11 | .....7.50 8.10 |
| Bartonville(48) K4 | 7.50 8.10 |
| Buffalo W12 | ....7.40 8.80† |
| Cleveland A7 | ....7.40 .... |
| Crawfordsville M8 | 7.50 8.10 |
| Donora,Pa. A7 | ...7.40 7.80† |
| Duluth,Minn. A7 | ..7.40 7.80† |
| Fairfield T2 | .....7.40 7.80† |
| Houston(48) S5 | ..7.65 8.05** |
| Jacks'ville,Fla. M8 | 7.75 8.35 |
| Johnstown B2(48) | 7.40 7.975* |
| Joliet,Ill. A7 | ....7.40 7.80† |
| Kans.City(48) S5 | 7.65 8.05** |
| Kokomo C16 | ....7.50 7.90† |
| LosAngeles B3 | ..8.35 8.925* |
| Minnequa C10 | ...7.65 8.05** |
| Monessen P7(48) | 7.40 8.00†† |
| Palmer,Mass. W12 | 7.70 8.10† |
| Pitts.,Calif. C11 | ..8.35 8.75† |
| Portsmouth,O. P12 | 7.40 .... |
| Rankin A7 | .....7.40 7.80† |
| S.Chicago R2 | ....7.40 7.80** |
| S.SanFran. C10 | ..8.35 8.75** |
| Spar'wsPt.B2(48) | 7.50 8.075* |
| Str'ing(1)(48)N15 | 7.40 8.00†† |
| Struthers,O.(48)Y1 | 7.40 7.90‡ |
| Worcester,Mass.A7 | 7.70 .... |

*Based on 12.50c zinc; †5c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

**BALE TIES, Single Loop**

| | Col. |
|---|---|
| AlabamaCity,Ala. R2 | ...173 |
| Atlanta A11 | .....175 |
| Bartonville,Ill. K4 | .....175 |
| Crawfordsville,Ind. M8 | ..175 |
| Donora,Pa. A7 | .....173 |
| Duluth,Minn. A7 | .....173 |
| Fairfield,Ala. T2 | .....173 |
| Jacksonville,Fla. M8 | ....180 |
| Joliet,Ill. A7 | .....173 |
| Houston S5 | .....178 |
| KansasCity,Mo. S5 | ....178 |
| Kokomo,Ind. C16 | .....175 |
| Minnequa,Colo. C10 | ....178 |
| S.Chicago R2 | .....173 |
| S.SanFran.,Calif. C10 | ..197 |
| SparrowsPoint,Md. B2 | ..175 |
| Sterling,Ill.(1) N15 | .....173 |

**FENCE POSTS**

| | Col. |
|---|---|
| ChicagoHts.,Ill. C2, I-2 | ..157 |
| Duluth,Minn. A7 | .....157 |
| Franklin,Pa. F5 | .....157 |
| Huntington,W.Va. W7 | ..157 |
| Johnstown,Pa. B2 | .....157 |
| Marion,O. P11 | .....157 |
| Minnequa,Colo. C10 | ....162 |
| Moline,Ill. R2 | .....162 |
| S.Chicago,Ill. R2 | .....157 |
| Tonawanda,N.Y. B12 | ...157 |
| Williamsport,Pa. S10 | ....160 |

## FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

**Carriage, Machine Bolts**

| | |
|---|---|
| Full-Size Body (cut thread) | |
| 1½" x 6" and smaller | 61 |
| Larger than ½" diam. and all diams. longer than 6" | 55 |
| Under-Size Body (rolled thread; not nutted): | |
| ½" x 6" and smaller. | 61 |

†½" x 4" and smaller and shorter are not nutted.

**Carriage, Machine & Lag Bolts, Hot Galvanized:**

| | |
|---|---|
| ½" and smaller | 42 |
| Larger than ½" diam. and all diams. longer than 6" | 32 |

**Lag Bolts**

| | |
|---|---|
| All diams. & 6" and shorter | 61 |
| All diams. longer than 6" | 55 |

**Plow, Tap & Blank Bolts**

| | |
|---|---|
| ½" x 6" and smaller. | 61 |
| Larger than ½" diam. and all diams. longer than 6" | 55 |

**Ribbed Neck, Carriage, Step, Elevator, Fitting-up and Tire Bolts:**

| | |
|---|---|
| All sizes | 61 |

**STOVE BOLTS, SLOTTED (nuts not attached; bulk)**

| | |
|---|---|
| ⅛" to ¼" diam. incl., 3" or shorter: | |
| 25,000 to 199,999 pieces | 61 |
| 200,000 or more pieces | 64 |
| ⅛" to ½" diam. incl., 3" or shorter: | |
| 15,000 to 99,999 pieces | 61 |
| 100,000 or more pieces | 64 |
| Longer than 3", any diam.: | |
| 5000 to 99,999 pieces. | 61 |
| 100,000 or more pieces | 64 |

## RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95

⅞-in. under..List less 32%

## BOILER TUBES

Net base c.i. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

| O.D. In. | B.W. Gage | Seamless H.R. | Seamless C.D. | Elec. Weld H.R. |
|---|---|---|---|---|
| 1 | 13 | .... | 21.06 | 20.42 |
| 1¼ | 13 | .... | 24.94 | 20.45 |
| 1½ | 13 | 23.31 | 27.57 | 22.61 |
| 1⅝ | 13 | 27.54 | 32.57 | 26.71 |
| 2 | 13 | 30.87 | 36.51 | 29.93 |
| 2¼ | 13 | 34.77 | 41.12 | 33.72 |
| 2½ | 12 | 37.73 | 44.63 | 36.60 |
| 2½ | 12 | 41.57 | 49.16 | 40.31 |
| 2¾ | 12 | 45.00 | 53.22 | 43.65 |
| 3 | 12 | 47.99 | 56.76 | 46.55 |

## RAILWAY MATERIALS

| | Standard No. 1 | Standard No. 2 | Tee Rails All No. 2 | Tee Rails 60 lb Under |
|---|---|---|---|---|
| **RAILS** | | | | |
| Bessemer,Pa. U5 | 4.725 | 4.625 | 4.675 | 5.65 |
| Ensley,Ala. T2 | 4.725 | 4.625 | .... | 5.65 |
| Fairfield,Ala. T2 | .... | .... | .... | 5.65 |
| Gary,Ind. U5 | 4.725 | 4.625 | 4.675 | .... |
| Huntington,W.Va. W7 | .... | .... | .... | 5.65 |
| IndianaHarbor,Ind. I-2 | 4.725 | 4.625 | 4.675 | .... |
| Johnstown,Pa. B2 | .... | .... | ...(16) | 5.65 |
| Lackawanna,N.Y. B2 | 4.725 | 4.625 | ...(16) | 5.65 |
| Minnequa,Colo. C10 | 4.725 | 4.625 | .... | 6.15 |
| Steelton,Pa. B2 | 4.725 | 4.625 | .... | .... |
| Williamsport,Pa. S19 | .... | .... | .... | 5.65 |

**TIE PLATES**

| | |
|---|---|
| Fairfield,Ala. T2 | ....5.625 |
| Gary,Ind. U5 | .....5.625 |
| Ind.Harbor,Ind. I-2 | ...5.625 |
| Lackawanna,N.Y. B2 | ..5.625 |
| Minnequa,Colo. C10 | ...5.625 |
| Seattle B3 | .....5.775 |
| Steelton,Pa. B2 | .....5.625 |
| Torrance,Calif. C11 | ...5.775 |

**TRACK BOLTS (20) Treated**

| | |
|---|---|
| Cleveland R2 | .....12.90 |
| KansasCity,Mo. S5 | ....12.90 |
| Lebanon,Pa. B2 | ....12.15* |
| Minnequa,Colo. C10 | ...12.40 |
| Pittsburgh O3, P14 | ..12.15* |
| Seattle B3 | .....12.65* |

*Untreated

**AXLES**

| | |
|---|---|
| Ind.Harbor,Ind. S13 | ....7.25 |
| Johnstown,Pa. B2 | .....7.25 |

**JOINT BARS**

| | |
|---|---|
| Bessemer,Pa. U5 | ....5.825 |
| Fairfield,Ala. T2 | .....5.825 |
| Ind.Harbor,Ind. I-2 | ...5.825 |
| Joliet,Ill. U5 | .....5.825 |
| Lackawanna,N.Y. B2 | ..5.825 |
| Minnequa,Colo. C10 | ...5.825 |
| Steelton,Pa. B2 | .....5.825 |

**SCREW SPIKES**

| | |
|---|---|
| Cleveland R2 | .....11.90 |
| Pittsburgh O3 | .....11.90 |

**STANDARD TRACK SPIKES**

| | |
|---|---|
| Fairfield,Ala. T2 | .....7.90 |
| Ind.Harbor,Ind. I-2, Y1 | 7.90 |
| KansasCity,Mo. S5 | ....7.90 |
| Lebanon,Pa. B2 | .....7.90 |
| Minnequa,Colo. C10 | ....7.90 |
| Pittsburgh J5 | .....7.90 |
| Seattle B3 | .....8.40 |
| S.Chicago,Ill. R2 | .....7.90 |
| Struthers,O. Y1 | .....7.90 |
| Youngstown R2 | .....7.90 |

## METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

| | Cents |
|---|---|
| Sponge iron: | |
| 98+% Fe, annealed. | 9.25 |
| Swedish, c.i.f. Camden, N. J., c.l. in bags. | 9.50 |
| Domestic, f.o.b., Johnstown, Pa., Riverton, N.J., Niagara Falls, N.Y., in bags | 9.50 |
| Canadian, f.o.b. shipping point | 9.50 |
| Electrolytic iron: | |
| Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in. | 22.00 |
| Annealed, 99.5% Fe. | 36.50 |
| Unannealed (99+% Fe) | 34.00 |
| Unannealed (99+% Fe) (minus 325 mesh) | 57.00 |
| Powder Flakes (minus 16, plus 100 mesh). | 31.00 |
| Carbonyl Iron: | |
| 97.9-99.8% size 5 to 10 microns. | $3.00-148.00 |
| Aluminum: | |
| Atomized, 500 lb, drum frght. allowed | |
| Carlots | 34.50 |
| Ton lots | 36.50 |
| Antimony, 500 lb lots | 32.00* |
| Brass, 5000-lb lots | 38.25-52.25† |
| Bronze, 5000-lb lots | 63.75-67.00† |
| Copper: | |
| Electrolytic | 14.25* |
| Reduced | 14.25* |
| Lead | 7.50* |
| Manganese: | |
| Minus 35 mesh | 64.00 |
| Minus 100 mesh | 70.00 |
| Minus 200 mesh | 75.00 |
| Nickel, unannealed | $1.00 |
| Nickel-Silver, 5000-lb lots | 59.75-62.50† |
| Phosphor-Bronze, ¼-ton lots | 58.50 |
| Silicon | 47.50 |
| Solder | 7.00* |
| Stainless Steel, 302 | 99.00 |
| Stainless Steel, 316 | $1.32 |
| Tin | 14.50* |
| Zinc 5000-lb lots | 19.25-33.00‡ |
| Tungsten | Dollars |
| Melting grade, 99% 60 to 200 mesh: | |
| *1000 lb and over* | *4.50* |
| *Less than 1000 lb* | *4.65* |
| Chromium, electrolytic *99.8% Cr min. metallic basis* | *5.00* |

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

## Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Plus 4c per 100 lb.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 7.95c over 3½-in. and other shapes.

## SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| Size—Inches | 2 | | 2½ | | 3 | | 3½ | | 4 | | 5 | | 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 37c | | 58.5c | | 76.5c | | 92c | | $1.09 | | $1.48 | | $1.92 | |
| Pounds Per Ft | 3.68 | | 5.82 | | 7.62 | | 9.20 | | 10.89 | | 14.81 | | 19.18 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | 6.5 | +11.5 | 10.5 | +8.25 | 13 | +5.75 | 14.5 | +4.25 | 14.5 | +4.25 | 14 | +4.75 | 16.5 | +2.25 |
| Ambridge, Pa. N2 | 6.5 | .. | 10.5 | ... | 13 | ... | 14.5 | ... | 14.5 | ... | 14 | ... | 16.5 | ... |
| Lorain, O. N3 | 6.5 | +11.5 | 10.5 | +8.25 | 13 | +5.75 | 14.5 | +4.25 | 14.5 | +4.25 | 14 | +4.75 | 16.5 | +2.25 |
| Youngstown Y1 | 6.5 | +11.5 | 10.5 | +8.25 | 13 | +5.75 | 14.5 | +4.25 | 14.5 | +4.25 | 14 | +4.75 | 16.5 | +2.25 |

## ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Youngstown R2 | 6.5 | +11.5 | 10.5 | +8.25 | 13 | +5.75 | 14.5 | +4.25 | 14.5 | +4.25 | 14 | +4.75 | 16.5 | +2.25 |

## BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| Sizes—Inches | ⅛ | | ¼ | | ⅜ | | ½ | | ¾ | | 1 | | 1¼ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 5.5c | | 6c | | 6c | | 8.5c | | 11.5c | | 17c | | 23c | |
| Pounds Per Ft | 0.24 | | 0.42 | | 0.57 | | 0.85 | | 1.13 | | 1.68 | | 2.28 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | ... | ... | .... | .... | .... | .... | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Alton, Ill. L1 | ... | ... | .... | .... | .... | .... | 16.5 | +2.75 | 19.5 | 1.25 | 22 | 4.75 | 24.5 | 6.5 |
| Benwood, W. Va. W10 | 17.5 | +13 | 9 | +18.5 | +0.75 | +28.5 | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Butler, Pa. F6 | 18 | +12.5 | 9.5 | +18 | 1.5 | +26 | ... | ... | ... | ... | ... | ... | ... | ... |
| Etna, Pa. N2 | ... | ... | .... | .... | .... | .... | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Fairless Hills, Pa. N3 | ... | ... | .... | .... | .... | .... | 16.5 | +2.75 | 19.5 | 1.25 | 22 | 4.75 | 24.5 | 6.5 |
| Fontana, Calif. K1 | ... | ... | .... | .... | .... | .... | 7 | +12.25 | 10 | +8.25 | 12.5 | +4.75 | 15 | +3 |
| Ind. Harbor, Ind. Y1 | ... | ... | .... | .... | .... | .... | 17.5 | +1.75 | 20.5 | 2.25 | 23 | 5.75 | 25.5 | 7.5 |
| Lorain, O. N3 | ... | ... | .... | .... | .... | .... | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Sharon, Pa. S4 | 18 | +12.5 | 9.5 | +18 | 1.5 | +26 | ... | ... | ... | ... | ... | ... | ... | ... |
| Sharon, Pa. M6 | ... | ... | .... | .... | .... | .... | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Sparrows Pt., Md. B2 | 16 | +12.5 | 7.5 | +18 | +0.5 | +25 | 16.5 | +0.75 | 19.5 | 3.25 | 22 | 6.75 | 24.5 | 8 |
| Youngstown R2, Y1 | ... | ... | .... | .... | .... | .... | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |
| Wheatland, Pa. W9 | 18 | +12.5 | 9.5 | +18 | 1.5 | +26 | 18.5 | +0.75 | 21.5 | 3.25 | 24 | 6.75 | 26.5 | 8.5 |

| Size—Inches | 1½ | | 2 | | 2½ | | 3 | | 3½ | | 4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 27.5c | | 37c | | 58.5c | | 76.5c | | 92c | | $1.09 | |
| Pounds Per Ft | 2.73 | | 3.68 | | 5.82 | | 7.62 | | 9.20 | | 10.89 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | .... | ... | .... | ... |
| Alton, Ill. L1 | 25 | 7.5 | 25.5 | 8 | 27 | 8.75 | 27 | 8.75 | .... | ... | .... | ... |
| Benwood, W. Va. W10 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | 19.5 | 0.75 | 19.5 | 0.75 |
| Etna, Pa. N2 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | 19.5 | 0.75 | 19.5 | 0.75 |
| Fairless Hills, Pa. N3 | 25 | 7.5 | 25.5 | 8 | 27 | 8.75 | 27 | 8.75 | 17.5 | +1.25 | 17.5 | +1.25 |
| Fontana, Calif. K1 | 15.5 | +2 | 16 | +1.5 | 17.5 | +0.75 | 17.5 | +0.75 | 8 | +10.75 | 8 | +10.75 |
| Ind. Harbor, Ind. Y1 | 26 | 8.5 | 26.5 | 9 | 28 | 9.75 | 28 | 9.75 | 18.5 | +0.25 | 18.5 | +0.25 |
| Lorain, O. N3 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | .... | ... | .... | ... |
| Sharon, Pa. M6 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | .... | .. | .... | .. |
| Sparrows Pt., Md. B2 | 25 | 9 | 25.5 | 9.5 | 27 | 9.75 | 27 | 9.75 | 17.5 | +0.25 | 17.5 | +0.25 |
| Youngstown R2, Y1 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | 19.5 | 0.75 | 19.5 | 0.75 |
| Wheatland, Pa. W9 | 27 | 9.5 | 27.5 | 10 | 29 | 10.75 | 29 | 10.75 | 19.5 | 0.75 | 19.5 | 0.75 |

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

# Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

| AISI Type | Rerolling Slabs | Rerolling Ingot | Forging Billets | Seamless Tube Billets | H.R. Strip | Wire Rods; C.F. Wire | Bars; Structural Shapes | Plates | Sheets | C.R. Strip; Flat Wire |
|---|---|---|---|---|---|---|---|---|---|---|
| 201 | 18.50 | 23.00 | .... | .... | 31.00 | .... | .... | .... | 42.25 | 39.00 |
| 202 | 19.75 | 25.50 | 31.00 | 36.25 | 33.50 | .... | 36.75 | 38.75 | 42.50 | 42.50 |
| 301 | 19.25 | 23.75 | .... | 36.75 | 32.00 | 36.00 | 38.00 | .... | 44.25 | 41.00 |
| 302 | 20.50 | 26.25 | 32.00 | 37.25 | 34.50 | 36.25 | 38.25 | 40.25 | 44.50 | 44.50 |
| 302B | 20.25 | 26.50 | 33.00 | 37.25 | 37.75 | 36.25 | 38.25 | 40.25 | 47.00 | 47.00 |
| 303 | .... | 26.75 | 34.75 | 40.00 | .... | 39.00 | 41.00 | .... | .... | .... |
| 304 | 21.75 | 27.50 | 33.75 | 39.00 | 37.25 | 38.25 | 40.25 | 43.00 | 47.25 | 47.25 |
| 304L | .... | .... | 38.75 | 44.00 | 42.25 | 43.25 | 45.25 | 48.00 | 52.25 | 52.25 |
| 305 | 23.25 | 30.25 | .... | 39.50 | 40.25 | 38.25 | 40.25 | 43.50 | 50.25 | 50.25 |
| 308 | 23.50 | 30.50 | 38.50 | 44.25 | 41.25 | 43.25 | 45.50 | 49.75 | 52.00 | 52.00 |
| 309 | 31.00 | 39.75 | 46.75 | 53.50 | 53.50 | 52.00 | 54.75 | 58.25 | 67.00 | 67.00 |
| 310 | 37.25 | 48.00 | 62.25 | 72.25 | 68.50 | 69.75 | 73.50 | 75.25 | 78.75 | 78.75 |
| 314 | .... | .... | .... | .... | .... | 69.75 | .... | 75.25 | .... | .... |
| 316 | 31.50 | 40.25 | 51.25 | 59.50 | 58.25 | 57.75 | 60.75 | 64.00 | 68.25 | 68.25 |
| 316L | .... | .... | 56.25 | 64.50 | 63.25 | 62.75 | 65.75 | 69.00 | 73.25 | 73.25 |
| 317 | 37.25 | 48.25 | 62.75 | 72.75 | 73.50 | 70.75 | 74.50 | 77.00 | 83.75 | 83.75 |
| 321 | 25.00 | 32.00 | 38.25 | 44.00 | 44.25 | 43.00 | 45.25 | 49.25 | 54.25 | 54.25 |
| 18-8CbTa | 29.25 | 38.00 | 45.75 | 52.25 | 53.25 | 50.75 | 53.50 | 58.00 | 66.50 | 66.50 |
| 403 | .... | .... | 28.75 | 32.75 | .... | 32.25 | 34.00 | 36.25 | .... | .... |
| 405 | 17.50 | 23.00 | 26.75 | 31.00 | 32.25 | 30.50 | 32.00 | 33.75 | 42.25 | 42.25 |
| 410 | 15.00 | 19.50 | 25.50 | 29.50 | 28.00 | 29.00 | 30.50 | 31.75 | 36.25 | 36.25 |
| 416 | .... | .... | 26.00 | 30.00 | .... | 29.50 | 31.00 | .... | .... | .... |
| 420 | .... | 30.25 | 31.00 | 36.00 | 37.75 | 35.50 | 37.25 | 40.75 | 56.00 | 56.00 |
| 430 | 15.25 | 19.75 | 26.00 | 30.00 | 28.75 | 29.50 | 31.00 | 32.25 | 36.75 | 36.75 |
| 430F | .... | .... | 26.50 | 30.50 | .... | 30.00 | 31.50 | .... | .... | .... |
| 431 | .... | 25.50 | 33.25 | .... | .... | 37.25 | 39.25 | 40.75 | .... | .... |
| 446 | .... | .... | 35.50 | 40.50 | 53.25 | 40.00 | 42.00 | 43.25 | 63.25 | 63.25 |

**Stainless Steel Producers Are:** Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

# Clad Steel

| | Plates: Carbon Base 10% | Plates: Carbon Base 20% | Sheets: Carbon Base 20% |
|---|---|---|---|
| 302 | .... | .... | 30.50 |
| 304 | 30.30 | 36.05 | 32.50 |
| 304-L | 32.30 | 37.95 | .... |
| 310 | 41.30 | 47.00 | .... |
| 316 | 35.50 | 41.40 | 47.00 |
| 316-L | 40.00 | 46.10 | .... |
| 316-CB | 41.15 | 48.45 | .... |
| 321 | 32.00 | 37.75 | 37.25 |
| 347 | 34.40 | 41.40 | 48.25 |
| 405 | 25.80 | 33.35 | .... |
| 410 | 25.30 | 32.85 | .... |
| 430 | 25.30 | 32.85 | .... |
| Inconel | 49.45 | 65.45 | .... |
| Nickel | 41.05 | 55.65 | .... |
| Nickel, Low Carbon | 43.25 | 60.05 | .... |
| Monel | 42.35 | 56.35 | .... |
| Copper* | .... | .... | 46.00 |

| | Strip, Carbon Base, Cold Rolled: 10% | Strip, Carbon Base, Cold Rolled: Both Sides |
|---|---|---|
| Copper* | 30.00 | 38.00 |

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

# Tool Steel

| Grade | $ per lb | Grade | $ per lb |
|---|---|---|---|
| Regular Carbon | 0.275 | 5% Cr Hot Work | 0.430-0.460 |
| Extra Carbon | 0.330 | W-Cr Hot Work | 0.450 |
| Special Carbon | 0.390 | V-Cr Hot Work | 0.470 |
| Oil Hardening | 0.430 | Hi-Carbon-Cr | 0.770 |

Grade by Analysis (%)

| W | Cr | V | Co | Mo | $ per lb |
|---|---|---|---|---|---|
| 20.25 | 4.25 | 1.6 | 12.25 | ... | 4.090 |
| 18.25 | 4.25 | 1 | 4.75 | ... | 2.305-2.475 |
| 18 | 4 | 2 | 9 | ... | 2.675-2.6775 |
| 18 | 4 | 2 | .... | ... | 1.765 |
| 18 | 4 | 1 | .... | ... | 1.600 |
| 13.75 | 3.75 | 2 | 5 | ... | 2.245 |
| 13.5 | 4 | 3 | .... | ... | 1.865 |
| 9 | 3.5 | .. | .... | ... | 1.180 |
| 6 | 4 | 2 | .... | 5 | 1.105 |
| 6 | 4 | 3 | .... | 6 | 1.350 |
| 1.5 | 4 | 1 | .... | 8.5 | 0.960 |

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

# Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

| *Birmingham District* | Basic | No. 2 Foundry | Malleable | Bessemer |
|---|---|---|---|---|
| AlabamaCity,Ala. R2 | 54.50 | 55.00‡ | .... | .... |
| Birmingham R2 | 54.50 | 55.00‡ | .... | .... |
| Birmingham U6 | .... | 55.00‡ | 59.00 | .... |
| Woodward,Ala. W15 | 54.50 | 55.00‡ | 59.00 | .... |
| Cincinnati, deld. | .... | 62.70 | .... | .... |
| *Buffalo District* | | | | |
| Buffalo H1, R2 | 58.50 | 59.00 | 59.50 | 60.00 |
| Tonawanda,N.Y. W12 | 58.50 | 59.00 | 59.50 | 60.00 |
| N.Tonawanda,N.Y. T9 | .... | 59.00 | 59.50 | 60.00 |
| Boston, deld. | 69.15 | 69.65 | 70.15 | .... |
| Rochester,N.Y. deld. | 61.52 | 62.02 | 62.52 | .... |
| Syracuse,N.Y. deld. | 62.62 | 63.12 | 63.62 | .... |
| *Chicago District* | | | | |
| Chicago I-3 | 58.50 | 59.00 | 59.00 | 59.50 |
| Gary,Ind. U5 | 58.50 | .... | 59.00 | .... |
| S.Chicago R2 | 58.50 | .... | 59.00 | .... |
| S.Chicago,Ill. Y1 | 58.50 | 59.00 | 59.00 | 59.50 |
| S.Chicago,Ill. U5, W14 | 58.50 | .... | 59.00 | 59.50 |
| Milwaukee, deld. | 60.67 | 61.17 | 61.17 | 61.67 |
| Muskegon,Mich. deld. | .... | 65.30 | 65.30 | .... |
| *Cleveland District* | | | | |
| Cleveland A7, R2 | 58.50 | 59.00 | 59.00 | 59.50 |
| Akron,O., deld. | 61.25 | 61.75 | 61.75 | 62.25 |
| Lorain,O. N3 | 58.50 | .... | .... | 59.50 |
| *Mid-Atlantic District* | | | | |
| Bethlehem,Pa. B2 | 60.50 | 61.00 | 61.50 | 62.00 |
| NewYork, deld. | .... | 64.78 | 65.28 | .... |
| Newark, deld. | 63.52 | 64.02 | 64.52 | 65.02 |
| Birdsboro,Pa. B10 | 60.50 | 61.00 | 61.50 | 62.00 |
| Chester,Pa. P14 | 60.50 | 61.00 | 61.50 | .... |
| Philadelphia, deld. | 62.16 | 62.66 | 63.16 | .... |
| Steelton,Pa. B2 | 60.50 | 61.00 | 61.50 | 62.00 |
| Swedeland,Pa. A3 | 60.50 | 61.00 | 61.50 | 62.00 |
| Philadelphia, deld. | 62.16 | 62.66 | 63.16 | 63.66 |
| Troy,N.Y. R2 | 60.50 | 61.00 | 61.50 | 62.00 |
| *Pittsburgh District* | | | | |
| NevilleIsland,Pa. P6 | 58.50 | 59.00 | 59.00 | .... |
| Pittsburgh (N&S sides), Aliquippa, deld. | .... | 60.37 | 60.37 | 60.87 |
| McKeesRocks, deld. | .... | 60.04 | 60.04 | 60.54 |
| Lawrenceville,Homestead, Wilmerding, Monaca, deld. | .... | 60.66 | 60.66 | 61.16 |
| Verona,Trafford, deld. | 60.69 | 61.19 | 61.19 | 61.69 |
| Brackenridge, deld. | 60.95 | 61.45 | 61.45 | 61.95 |
| Bessemer,Pa. U5 | 58.50 | .... | 59.00 | 59.50 |
| Clairton,Rankin,S.Duquesne,Pa. U5. | 58.50 | .... | .... | .... |
| McKeesport,Pa. N3 | 58.50 | .... | .... | 59.50 |
| Midland,Pa. C18 | 58.50 | .... | .... | .... |

| *Youngstown District* | Basic | No. 2 Foundry | Malleable | Bessemer |
|---|---|---|---|---|
| Hubbard,O. Y1 | .... | .... | 59.00 | .... |
| Sharpsville,Pa. S6 | 58.50 | .... | 59.00 | 59.50 |
| Youngstown Y1 | .... | .... | 59.00 | 59.50 |
| Youngstown U5 | 58.50 | .... | .... | 59.50 |
| Mansfield,O., deld. | 63.40 | .... | 63.90 | 64.40 |
| Duluth I-3 | 58.50 | 59.00 | 59.00 | 59.50 |
| Erie,Pa. I-3 | 58.50 | 59.00 | 59.00 | 59.50 |
| Everett,Mass. E1 | 62.00 | 62.50 | 63.00 | .... |
| Fontana,Calif. K1 | 64.50 | 65.00 | .... | .... |
| Geneva,Utah C11 | 58.50 | 59.00 | .... | .... |
| GraniteCity,Ill. G4 | 60.40 | 60.90 | 61.40 | .... |
| Ironton,Utah C11 | 58.50 | 59.00 | .... | .... |
| LoneStar,Texas L6 | .... | 55.00* | .... | .... |
| Minnequa,Colo. C10 | 60.50 | 61.00 | 61.50 | .... |
| Rockwood,Tenn. T3 | .... | 55.00‡ | 59.00 | .... |
| Toledo,O. I-3 | 58.50 | 59.00 | 59.00 | 59.50 |
| Cincinnati, deld. | 64.26 | 64.76 | .... | .... |

*Phos. 0.51-0.75%; $56. Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

## PIG IRON DIFFERENTIALS

*Silicon:* Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

*Manganese:* Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

*Nickel:* Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

## BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

| | |
|---|---|
| Jackson,O. G2, J1 | $67.50 |
| Buffalo H1 | 68.75 |

## ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

| | |
|---|---|
| NiagaraFalls,N.Y. P15 | $91.00 |
| Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2) | 95.50 |
| Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2 | 98.50 |

## LOW PHOSPHORUS PIG IRON, Gross Ton

| | |
|---|---|
| Lyles,Tenn. T3 (Phos. 0.035% max) | $72.50 |
| Rockwood,Tenn. T3 (Phos. 0.0035% max) | 72.50 |
| Steelton,Pa. B2 (Phos. 0.035% max) | 66.50 |
| Philadelphia, deld. | 70.05 |
| Troy,N.Y. R2 (Phos. 0.035% max) | 66.50 |
| Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max) | 63.50 |
| Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max) | 63.50 |
| Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max) | 63.50 |
| Pittsburgh P6 (Intermediate) (Phos. 0.036-0.075% max) | 63.50 |

# Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Buffalo, Chicago, Chattanooga, Cincinnati, Cleveland, Detroit, Erie, Jackson, Milwaukee, Pittsburgh, St. Louis, 15 cents; Baltimore, Boston, Los Angeles, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

| | SHEETS | | | | STRIP | BARS | | | | Standard | PLATES | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot-Rolled | Cold-Rolled | Gal. 10 Ga.† | Stainless Type 302 | Hot-Rolled* | H.R. Merchant Qual. | H.R. Spec. Qual. | C.F. Rds.‡ | H.R. Alloy 4140††[5] | Structural Shapes | Carbon | Floor |
| Atlanta | 7.14 | 8.20 | 8.87 | .... | 7.40 | 7.42 | ... | 9.39 | .... | 7.63 | 7.49 | 9.48 |
| Baltimore | 7.08 | 8.32 | 8.50 | .... | 7.65 | 7.66 | ... | 8.62[3] | 13.49 | 7.93 | 7.21 | 8.87 |
| Birmingham | 7.00 | 8.24 | 8.85 | .... | 7.21 | 7.27 | ... | 9.35 | .... | 7.43 | 7.14 | 9.34 |
| Boston | 7.75 | 8.81 | 10.27 | 45.57 | 7.96 | 7.87 | 8.40 | 9.67 | 13.50 | 8.13 | 7.89 | 9.36 |
| Buffalo | 7.05 | 8.25 | 10.01 | .... | 7.35 | 7.35 | 8.20 | 7.90 | 13.35 | 7.60 | 7.35 | 8.90 |
| Chattanooga | 6.95 | 8.10 | 8.60 | .... | 7.20 | 7.20 | ... | 9.18 | .... | 7.45 | 7.25 | 9.05 |
| Chicago | 7.13 | 8.24 | 9.10 | 49.05 | 7.21 | 7.27 | 7.80 | 7.75 | 13.05 | 7.43 | 7.45 | 8.61 |
| Cincinnati | 7.12 | 8.23 | 9.10 | 46.10 | 7.45 | 7.51 | 8.04 | 8.15 | 13.29 | 7.90 | 7.43 | 8.86 |
| Cleveland | 7.13 | 8.24 | 8.95 | 49.16 | 7.31 | 7.33 | 7.86 | 8.00 | 13.11 | 7.76 | 7.62 | 8.78 |
| Detroit | 7.19 | 8.43 | 8.93 | 43.50 | 7.49 | 7.55 | 8.08 | 8.04 | 13.25 | 7.90 | 7.42 | 8.80 |
| Erie, Pa. | 7.08 | 8.24 | 8.95[10] | .... | 7.31 | 7.35 | ... | 8.10[10] | .... | 7.65 | 7.30 | 8.79 |
| Houston | 7.85 | 8.75 | 10.49 | .... | 8.15 | 8.25 | ... | 9.85 | 14.00 | 8.20 | 7.80 | 9.20 |
| Jackson, Miss. | 7.10 | 8.20 | 9.20 | .... | 7.40 | 7.40 | ... | 9.44 | .... | 7.60 | 7.45 | 9.30 |
| Los Angeles | 8.05 | 10.00 | 11.00 | 51.50 | 8.35 | 8.15 | 8.70 | 10.90 | 14.35 | 8.30 | 8.55 | 10.25 |
| Milwaukee | 7.22 | 8.33 | 9.19 | .... | 7.30 | 7.36 | 7.89 | 7.94 | 13.14 | 7.60 | 7.54 | 8.70 |
| Moline, Ill. | 7.15 | 8.44 | 8.85 | .... | 7.41 | 7.43 | ... | 8.10 | .... | 7.63 | 7.34 | ... |
| New York | 7.61 | 8.84 | 9.59 | 44.95 | 8.17 | 8.11 | 8.66 | 9.72 | 13.43 | 8.09 | 7.86 | 9.29 |
| Norfolk, Va. | 7.25 | ... | ... | .... | 7.65 | 7.65 | ... | 9.50 | .... | 7.95 | 7.45 | 8.95 |
| Philadelphia | 7.19 | 8.42 | 9.37 | 45.98 | 7.67 | 7.68 | 8.21 | 8.46 | 13.21 | 7.74 | 7.37 | 8.69** |
| Pittsburgh | 7.13 | 8.24 | 9.40 | 49.00 | 7.31 | 7.27 | 7.80 | 8.00 | 13.05 | 7.43 | 7.45 | 8.61 |
| Portland, Oreg. | 7.80 | 8.80 | 10.65 | .... | 8.00 | 7.95 | ... | 12.20 | 15.00 | 7.85 | 7.75 | 9.60 |
| Richmond, Va. | 7.15 | ... | 9.59 | .... | 7.80 | 7.85 | ... | 9.50 | .... | 8.10 | 7.35 | 9.25 |
| St. Louis | 7.42 | 8.53 | 9.34 | 43.89 | 7.50 | 7.56 | 8.09 | 8.29 | 13.34 | 7.83 | 7.74 | 8.90 |
| St. Paul | 7.46 | 8.59 | 9.16 | .... | 7.72 | 7.74 | ... | 8.51 | 13.51 | 7.94 | 7.65 | 9.12 |
| San Francisco | 8.10 | 9.65 | 10.15 | 51.65 | 8.35 | 8.10 | 8.65 | 11.40 | 14.30[3] | 8.20 | 8.00 | 10.20 |
| Seattle | 8.55 | 10.40 | 10.80 | 54.00 | 8.65 | 8.40 | 8.95 | 12.10 | 14.65 | 8.30 | 8.20 | 10.10 |
| Spokane | 8.55 | 11.00[7] | 10.80 | .... | 9.05 | 8.40 | 8.95 | 12.10 | 15.40 | 8.30 | 8.20 | 10.60 |
| Washington | 7.50 | 8.79 | 7.97 | .... | 8.12 | 8.08 | ... | 9.09 | .... | 8.40 | 7.68 | 9.34 |

*Prices do not include gage extras; †prices include gage and coating extras (based on 13.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **¼-in. and heavier; ††as annealed; §§under ⅛-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—500 to 9999 lb; [5]—400 to 999 lb; [6]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over; [10]—2000 lb and over.

## Atlantic Steel adds their second 75-ton Lectromelt* Furnace

SOUTHERN steel production received another boost early this winter when Atlantic Steel Company's new electric furnace began operation. This 75-ton Lectromelt Furnace is the second such unit to be installed by this Atlanta, Georgia, firm during the past three years.

125,000 tons of steel per year are added by this new furnace, increasing their ingot capacity by 30%.

Atlantic Steel laid out this plant, from scrap storage yard to pouring pit, around these Lectromelt Furnaces. This fact, plus the economies of time and labor contributed by Lectromelt's top-charging and ability to pour on the power, account for the higher production and constant increase in quality being achieved here.

Pittsburgh Lectromelt Furnace Corporation, 323 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in... GERMANY: Friedrich Kocks GMBH, Dusseldorf... ENGLAND: Birlec, Ltd., Birmingham ... FRANCE: Stein et Roubaix, Paris... BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege... SPAIN: General Electrica Espanola, Bilbao... ITALY: Forni Stein, Genoa... JAPAN: Daido Steel Co., Ltd., Nagoya

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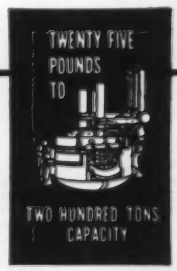

# New Thickness Standards

## Air Materiel Command announces preferred thicknesses for all sheet and strip metal used in military planes. Only aluminum industry has accepted the standards

A CHANGE in the military standard on thickness gage numbers for all uncoated and metal clad sheet and strip metals has been announced by the Air Materiel Command of the Air Force. But it will be a long time before the standard has much effect on rollers of aluminum, stainless steel, magnesium and titanium, the principal metals involved.

The main purpose of the change is to provide a simplified system, based on decimal parts of an inch, for designating thickness of metals used in aircraft practice, the Air Materiel Command says. Advantages cited: 1. The change will eliminate confusion caused by the various gage numbers used in the past. 2. It will increase the availability of warehouse stocks of those thicknesses commonly required. 3. It will reduce the number of sizes required for stock inventory and reduce over-all inventory.

**Origin**—The preferred thicknesses (see table) were worked out by the American Standards Association after lengthy conferences with designers, producers and distributors of sheet and strip metals, says the Aircraft Industries Association. Mills indicate they can roll any desired gage within their manufacturing limits, subject to standard tolerance limitations. The system in effect eventually will simplify their rolling procedure: They will have to roll fewer gages in larger quantities.

But there is considerable inventory of old sizes which must be used up, and the Air Force has set up conditions under which this older metal can be used before the new standards take effect. For the aluminum industry, it has been estimated the time lag will be up to a year before such inventory is exhausted. In the meantime, inventories will increase rather than decrease because mills and distributors will have to stock both the old gages and the new.

**Substitution Allowed**—During this change-over period, the Air Force says it will allow fabricators to substitute old gages for the new, provided performance, gross weight and cost of weapon systems or other supporting equipment are not adversely affected. Substitution may be made freely when the nominal thickness substituted is the nearest thickness greater than required by drawings or other design data. Nearest thickness less than required by design data can also be used. But when parts having a low margin of safety are involved, the contractor must certify to the Procuring Service of the Air Force that the effect of the substitution on strength is negligible. If thickness changes are significant, the contractor is to notify the Procuring Service in the normal manner prescribed for handling engineering changes.

**Small Beginning**—Even though the Air Force's announcement indicated the standards are undergoing change, this is true only in the aluminum industry, and only to a small degree there. Since Jan. 1, producers have been rolling alloy 2024 and Alclad 2024 and Alclad 7075 to the new thicknesses for aircraft orders. The Aircraft Industries Association, which apparently is the main force behind the move, hopes the industry will extend the standards to other alloys.

The only other metal industry interested so far is magnesium. It is in the process of studying the proposal to see how it will affect present methods of rolling and selling sheet and strip. A check by STEEL reveals that the stainless steel industry is unaware of the new standards. "There is no reason why we couldn't go along with the new standard," said the head of development engineering for one stainless company. "But it seems to me it would hamper the design engineer in the aircraft plant. He would be limited in his choice of metal thickness."

**Full Consideration**—Aircraft Industries says this has been considered in setting up the preferred gages. Once the physicals of the metal required have been determined, the engineer can choose the best gage.

Military Standard 33528 (ASG) is applicable to all new designs, Air Materiel Command says. But producers ask: "When is a standard really a standard? When the government says so, or when producers accept it?" Obviously, new designs cannot incorporate the new system if the mills aren't rolling the preferred thicknesses. With only a small portion of the sheet and strip requirements of the aircraft industry being produced according to the standard, it looks like it will be a long time before it will become accepted industry-wide.

### New Air Force Sheet, Strip Standards*

(Nominal thickness in inches)

| | |
|---|---|
| **.236** | **.048** |
| **.224** | **.045** |
| .212 | .042 |
| **.200** | **.040** |
| **.190** | .038 |
| **.180** | **.036** |
| .170 | .034 |
| **.160** | **.032** |
| .150 | .030 |
| **.140** | **.028** |
| .132 | .026 |
| **.125** | **.025** |
| .118 | .024 |
| **.112** | **.022** |
| .106 | **.020** |
| **.100** | **.018** |
| .095 | **.016** |
| **.090** | .014 |
| .085 | **.012** |
| **.080** | .011 |
| .075 | **.010** |
| **.071** | .009 |
| .067 | **.008** |
| **.063** | .007 |
| .060 | **.006** |
| **.056** | .005 |
| .053 | .004 |
| **.050** | |

*Preferred thicknesses are in boldface type
Source: Military Standard MS33528 (ASG)

## Steel Bars . . .

Bar Prices, Page 136

Hot-rolled carbon bar demand is still running ahead of supply, but less buying pressure is being exerted by some consumers. In addition to a leveling off in auto requirements, agricultural equipment builders are shaving estimated needs in the light of an indicated reduction in farm income this year. Also, demands of small forging manufacturers have eased a trifle.

Producers anticipate little difficulty maintaining full order books. They are accepting second quarter tonnage on a month-to-month basis, reporting strong demand for all sizes. Cold-finishers note some weakening in de-

mand, chiefly on automotive account. Over-all demand for cold-drawn bars, however, remains relatively strong. Appliance makers and construction applications are taking up any slack stemming from auto cutbacks.

Hot-rolled alloy bars are moving at a slightly slower pace.

## Sheets, Strip . . .

Sheet & Strip Prices, Pages 137 & 138

Automakers have canceled outright or deferred some cold-rolled sheet tonnage for March and April shipment, but the total volume isn't large and is not a noticeably disturbing market factor. All other consumers still are pressing for more tonnage, and, it appears, the shrinkage in auto needs will simply reduce the first quarter carry-over. The breathing space will permit some stockpiling by the motorcar builders. Expectations are the third quarter may see a resurgence in automotive requirements.

Sheet sellers have all the business they can handle in the major grades and most specialties, including enameling stock, stainless and electrical sheets. Galvanized sheets are in easier supply, but no tonnage appears to be seeking buyers. Overall, the sheet mills have been offered more business for second quarter than they can readily accommodate. In sheets, as in plates, shapes and bars, it is still largely a matter of rationing tonnage. Overdue shipments are disappearing as the mills steadily become more current on deliveries.

Conversion deals and the payment of premium prices are fading out of the picture, with demand more nearly in balance with supply.

Beginning second quarter, Detroit Steel Corp.'s Portsmouth Division will restrict orders for cold-rolled sheets to widths over 12 in. It is withdrawing its published extras for widths 12 in. and under Apr. 1, but will ship orders for narrower widths on its books up to that date.

Limiting orders to widths over 12 in. marks the return to practice that prevailed prior to 1954. A study of the division's cold-rolled sheet order pattern since August, 1953, revealed that narrow widths accounted for only a minor percentage of its sheet tonnage. Also, it was shown, the extra handling required hampered shipments.

The company's mills at Detroit and Hamden, Conn., produce cold-rolled sheet strip in a full range of widths under 24 in., extending down to approximately ½-in.

## Plates . . .

Plate Prices, Page 136

Plate inquiry continues in excess of supply, with no early signs of leveling off. In general, mill shipments are a month or more behind schedule, and plate fabricating shops, notably in New England, are hampered in expanding operations.

Fabricators are placing some second quarter orders, though the mills haven't opened books for that period on all sizes. Some suppliers slightly increased plate quotas for March shipment, but they have been so swamped with orders they may have to reduce April allotments.

The outlook for shipbuilding has been further brightened by the awarding of 14 tankers, requiring approximately 100,000 tons of hull steel, mostly plates. Of the total, six will be built in the yards of Bethlehem Steel Co., three by the New York Shipbuilding Corp., Camden, N. J., three by Newport News Shipbuilding & Dry Dock Co., Newport News, Va., and two by the Ingalls Shipbuilding Corp., Pascagoula, Miss.

Delivered prices on plates are generally higher than they were a month or two ago. Almost 90 per cent of

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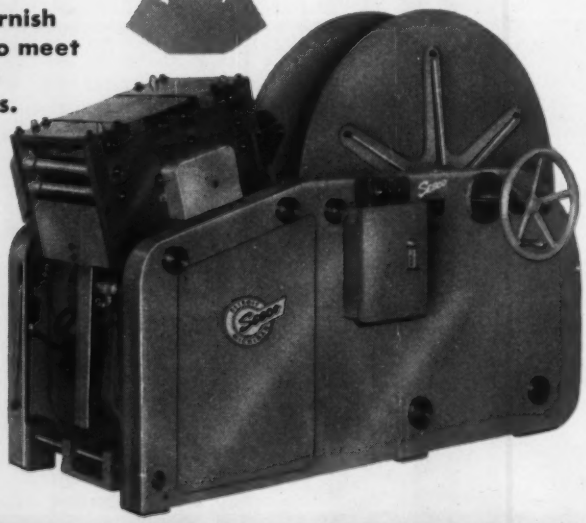
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current tonnage placements take one or more of the recently increased extras. Inland Steel Co. revised its extras on floor plates, effective Feb. 1, the first change this company has made in extras on this product since July 27, 1953.

Clad steel volume is heavier. Deliveries, hold at around eight to nine weeks.

## Wire . . .

Wire Prices, Pages 138 & 139

The slowing down in automotive production has eased supply of spring wire to some extent. Manufacturers wire producers continue to work five to seven days a week on heavy order backlogs. The high level of general industrial activity is forcing most mills to work overtime.

Where consumers have received cutbacks on automotive account, they have continued to take in tonnage for inventory. While there are minor shipment deferments and some cancellations of tonnage at mill level, there is a sufficient volume back-up to fill openings in schedules. Second quarter buying, however, is less brisk than was that for first quarter.

Although it's still too early for seasonal influences to be felt, merchant products demand is gaining slowly. Most producers anticipate substantial volume business this year. Wire nails are moving sluggishly, reflecting a seasonal lag in building.

## Tubular Goods . . .

Tubular Goods Prices, Page 140

Producers of large diameter line pipe and heavy oil country goods have commitments for much of their year's production. Current orders on books extend through the second quarter. Makers of small seamless tubes are optimistic over prospects for first half business, but they are less confident of third quarter volume.

Buttweld pipe supply is easy. Mill deliveries are available within three to four weeks. Lapweld deliveries, however, are more extended. One leading producer is promising late April shipment.

No sign of weakening in demand for mechanical and pressure tubing is noted for first half. With power projects expanding, sales of pressure tubing should hold at high level through the year. Auto builders are ordering mechanical tubing for inventories and replacement parts. They have not cut back tube orders.

Cast iron pipe demand is slightly more active. Strong spring buying movement is anticipated.

## Reinforcing Bars . . .

Reinforcing Bar Prices, Page 136

Steel piling, highway mat and concrete reinforcing bars are among the products in tightest supply. New tonnage demand is developing, notably for New England bridges. Bearing, sheet and tubular piling deliveries extend well through the second quarter. Several producers of piling are turning away inquiries, or they are accepting only part of the tonnage offered. Highway builders find mat reinforcing orders difficult to place. Reinforcing bar distributors are heavily booked, and their shipments are extended to the point delays in construction schedules are resulting. Prices on all types of reinforcing steel are strong.

## Structural Shapes . . .

Structural Shape Prices, Page 136

Though new structural business is generally described as spotty throughout the country, some seasonal improvement in demand for building steel is noted. This trend will accelerate as spring approaches. Currently, more bridges are being fig-


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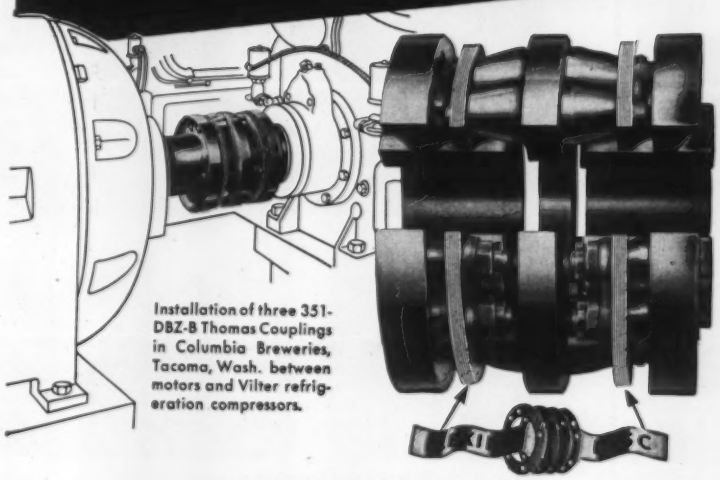

Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

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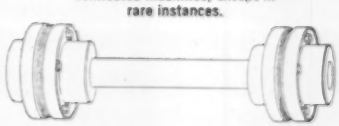

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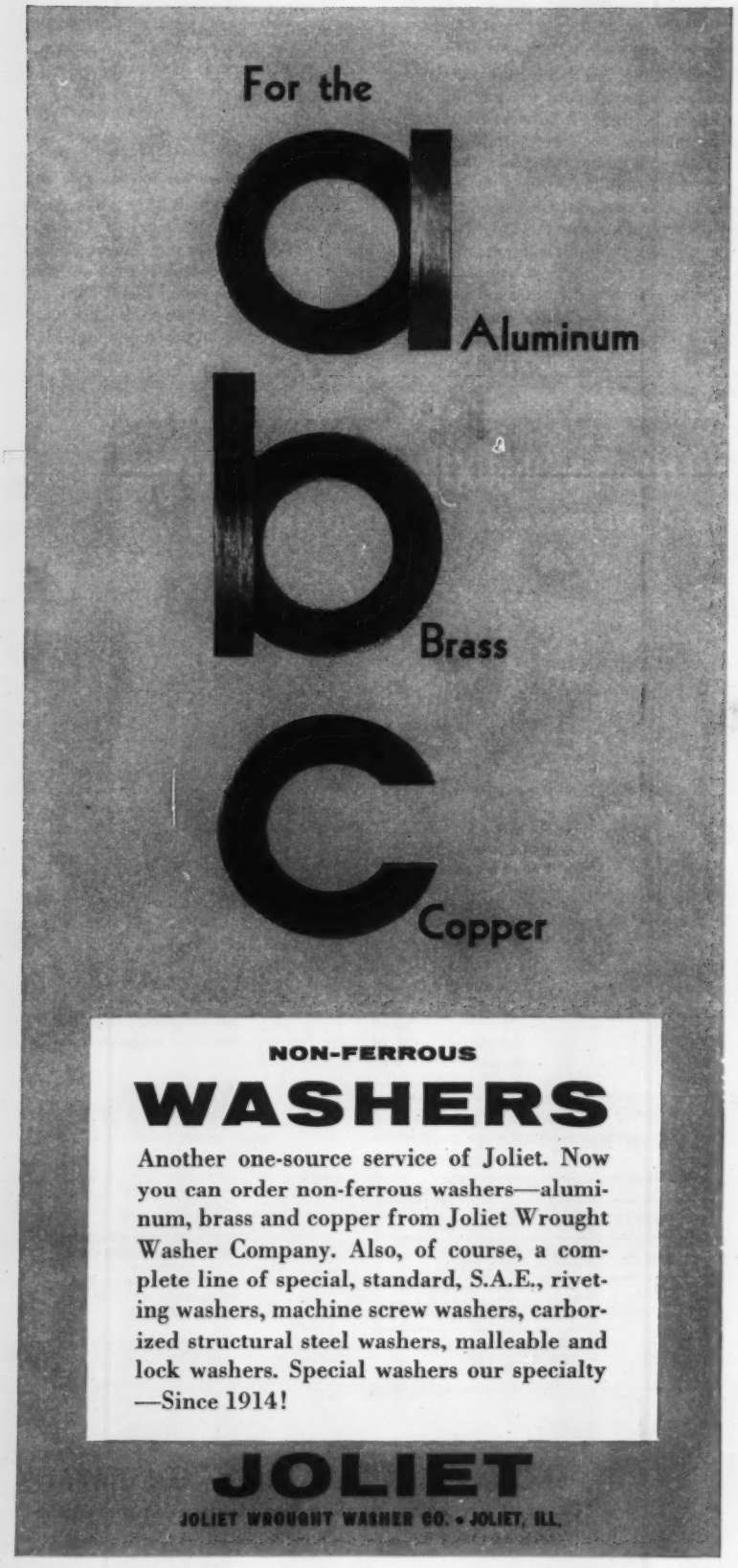
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ured, notably in New England and the East, but there is a fair diversity of other work developing also.

Outstanding in the East is an award of 8000 tons for a power plant for the Philadelphia Electric Co. In the Pacific Northwest, January bookings were heavy. Substantial tonnage is pending in that area, including 2000 tons for the Tacoma city hall and 4000 tons for a hangar at Larson Air Field.

Construction companies are meeting with little success in building stocks for the 1956 season. Only firms with priority ratings are assured of getting their first-half year requirements. In general the structural mills haven't committed themselves much beyond April.

## Stainless Steel . . .

Stainless Steel Prices, Page 140

Production of stainless and heat resisting steel ingots (excluding tool steel) last year totaled 1,191,177 net tons, reports the American Iron & Steel Institute. This compares with 824,117 in 1954 and 1,015,303 in all of 1953.

Output in fourth quarter was 311,994 tons, compared with 288,262 in the third quarter, 259,191 in the like quarter of 1954 and 178,900 in the fourth quarter of 1953.

## Tool Steel . . .

Tool Steel Prices, Page 140

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 114,529 net tons in all of 1955, reports the American Iron & Steel Institute. This was sharply up from the 84,143 tons shipped in 1954, but was off slightly from the 116,152 tons moved in 1953.

December shipments were 10,777 tons, against 10,615 in the preceding month, 7464 in the like month of 1954 and 8069 in December, 1953. The month's total was the largest since June, 1955, when 11,854 tons were moved.

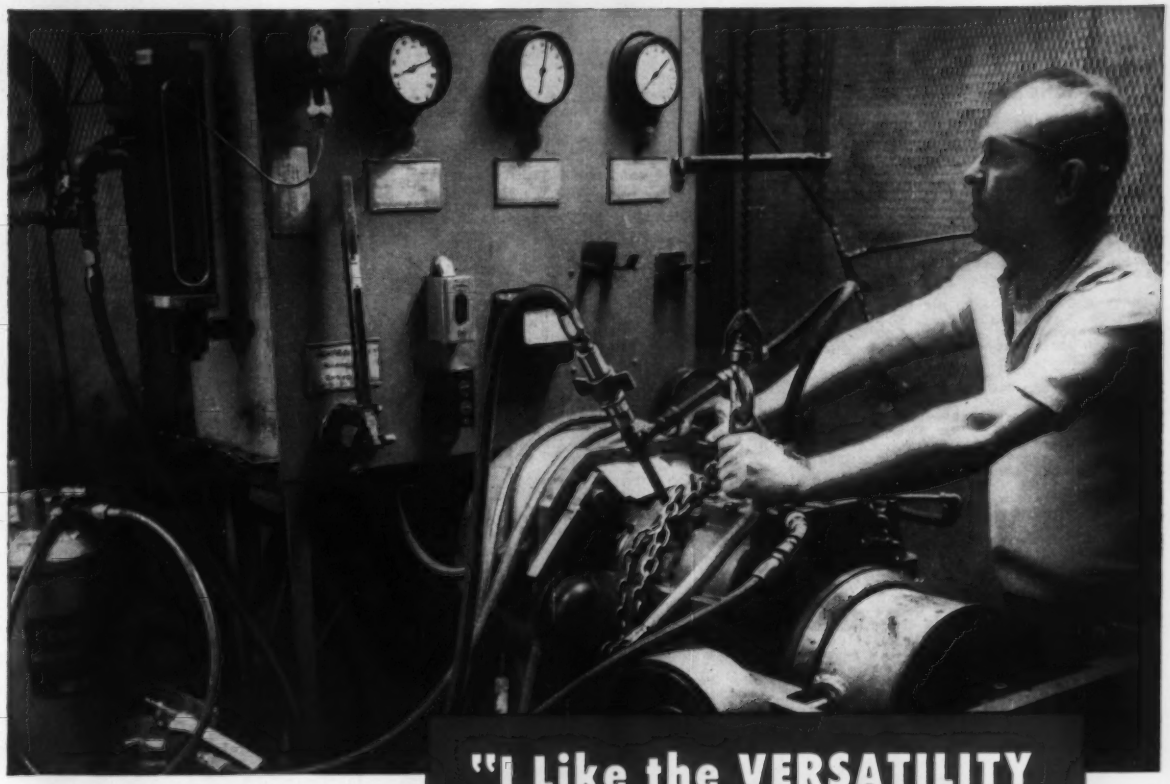
## Warehouse . . .

Warehouse Prices, Page 141

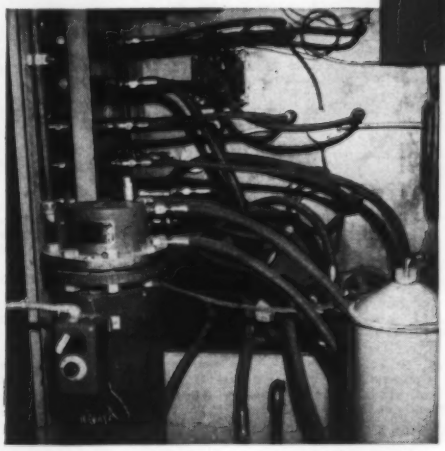
Continued brisk business is reported by steel distributors. Some warehousemen could sell more of every product if they had larger supplies. They have noted no effect of the recent auto slowdown on total bookings.

The weather has helped to cause a temporary lessening in the booming demand for structurals. Plates and shapes are in particularly tight

(*Please turn to page* 152)



Above—A mechanic tests a lift truck transmission. Aeroquip Self-Sealing Couplings are used to reduce hook-up time. Below—Rear view of a test panel, showing hose lines assembled from Aeroquip hose and reusable fittings.



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# Current Ferroalloy Quotations

## MANGANESE ALLOYS

**Spiegeleisen:** Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $94; 19-21% Mn, 1-3% Si, $91.50; 16-19% Mn, $89.50.

**Standard Ferromanganese:** (Mn 74-76%, C 7% approx.) Base price per net ton $205. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $213 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

**Low-Carbon Ferromanganese, Regular Grade:** (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 30.95c per lb of contained Mn, carload packed 32c, ton lots 33.5c, less ton 34.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

**Medium-Carbon Ferromanganese:** (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.35c per lb of contained Mn, packed, carload 23.4c, ton lot 25c, less ton 26.2c. Delivered. Spot, add 0.25c.

**Manganese Metal:** 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

**Electrolytic Manganese Metal:** Min carload, 30c; 2000 lb to min carload, 32c; 250 lb to 1999 lb, 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

**Silicomanganese:** (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.5c per lb of alloy. Packed, c.l. 12.5c, ton 12.95c, less ton 13.95c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

## TITANIUM ALLOYS

**Ferrotitanium, Low-Carbon:** (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

**Ferrotitanium, High-Carbon:** (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

**Ferrotitanium, Medium-Carbon:** (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

## CHROMIUM ALLOYS

**High-Carbon Ferrochrome:** Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

**Low-Carbon Ferrochrome:** (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02 max 38.50c, 0.03% max 38c, 0.06% max 36.50c, 0.1% max 36c, 0.15% max 35.75c, 0.2% max 35.50c, 0.5% max 35.25c, 1.0% max 34c, 1.5% max 33.85c, 2.0% max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

**Foundry Ferrochrome, High-Carbon:** (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

**Foundry Ferrochrome, Low-Carbon:** (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

**Low-Carbon Ferrochrome-Silicon:** (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

**Chromium Metal, Electrolytic:** Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

## VANADIUM ALLOYS

**Ferrovanadium:** Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

**Grainal:** Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

**Vanadium Oxide:** Contract, less carload lots, packed, $1.33 per lb contained $V_2O_5$, freight allowed. Spot, add 5c.

## SILICON ALLOYS

**25-30% Ferrosilicon:** Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

**50% Ferrosilicon:** Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

**Low-Aluminum 50% Ferrosilicon:** (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

**65% Ferrosilicon:** Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

**75% Ferrosilicon:** Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

**90% Ferrosilicon:** Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

**Silicon Metal:** (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

**Alsifer:** (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

## ZIRCONIUM ALLOYS

**12-15% Zirconium Alloy:** (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

**35-40% Zirconium Alloy:** (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

## BORON ALLOYS

**Ferroboron:** (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D. $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

**Borosil:** (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

**Bortam:** (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

**Carbortam:** (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

## CALCIUM ALLOYS

**Calcium-Manganese-Silicon:** (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

**Calcium-Silicon:** (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

## BRIQUETTED ALLOYS

**Chromium Briquets:** (Weighing approx. 3½ lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

**Ferromanganese Briquets:** (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 12.5c per lb of briquet, c.l. packed, pallets 12.7c, bags 13.5c; 3000 lb to c.l., pallets 13.9c; 2000 lb to c.l., bags, 14.7c, less ton 15.6c. Delivered. Add 0.25s for notching. Spot, add 0.25c.

**Silicomanganese Briquets:** (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.15c per lb of briquet, c.l. packed, pallets, 13.35c; bags 14.15c, 3000 lb to c.l., pallets, 14.55c; 2000 lb to c.l., bags, 15.35c; less ton 16.25c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

**Silicon Briquets:** (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags, 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

**Molybdic-Oxide Briquets:** (Containing 2½ lb of Mo each) $1.33 per pound of Mo contained, f.o.b. Langeloth, Pa.

## TUNGSTEN ALLOYS

**Ferrotungsten:** (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

## OTHER FERROALLOYS

**Ferrocolumbium:** (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

**Ferrotantalum—Columbium:** (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

**SMZ Alloy:** (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½ in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

**Graphidox No. 5:** (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

**V-5 Foundry Alloy:** (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

**Siminal:** (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 200 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

**Ferrophosphorus:** (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base; carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

**Ferromolybdenum:** (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, any quantity $1.46.

**Technical Molybdic-Oxide:** Per lb contained Mo, f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

*The Record's Clear . . .*
*you save money with every turn*
*of the screw with*
*AMERICAN PHILLIPS*

It's true — you can save up to 50% of your total fastening costs by switching to American Phillips Head Screws.

And the more complex your assembly — like a modern three-speed, high fidelity record player — the more you can save in every way. You save in faster assemblies because American Phillips are faster to drive than slotted screws. You save by cutting rejects of marred finished surfaces because the driver can't slip out of an American Phillips.

What's more, you get the famous American quality and the precision American deliveries that keep fast-paced assembly lines on schedule. *Whatever* you fasten, you can put American Phillips to your profit at every turn.

Like proof? Write.

X *marks the spot . . . the mark of extra quality*

**AMERICAN SCREW CO.**

PHILLIPS HEADquarters
WILLIMANTIC, CONNECTICUT

Plants at Willimantic, Conn. and at Norristown, Pa.
Warehouse and office at Chicago
Office, Detroit, Michigan

*Now, more than ever, you can depend on*

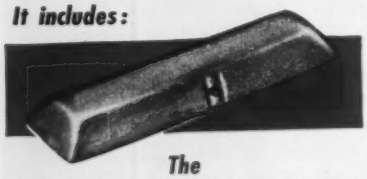
# HANNA

*as your best source for*

# PIG IRON

- *Our merchant capacity is bigger than ever*
- *Our plant is better than ever*
- *Our product range is greater than ever*

*It includes:*



*The*

**HANNA 38-POUND PIG**

**The foundryman's favorite standard pig. Available in all grades, silvery and HannaTite. A good example of the quality that has made Hanna "the best known name in iron."**

*The New*

**EXCLUSIVE HANNATEN INGOT**

**For 10-lb.-pig users, this new ingot means no free-carbon pockets, finer grain structure, more even melting. Available in all grades, silvery and HannaTite — an extra-close-grain iron.**

**THE HANNA FURNACE CORPORATION**

Buffalo • Detroit • New York • Philadelphia

**Merchant Pig Iron Division of**

NATIONAL STEEL CORPORATION


# Ores

**Lake Superior Iron Ore**

(Prices effective for the 1956 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

| | |
|---|---|
| Old range bessemer | $11.25 |
| Old range nonbessemer | 11.10 |
| Mesabi bessemer | 11.00 |
| Mesabi nonbessemer | 10.85 |
| Open-hearth lump | 12.10 |
| High phos. | 10.85 |

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

**Eastern Local Iron Ore**

Cents per unit, deld. E. Pa.

| | |
|---|---|
| Foundry and basic 52-62% concentrates contract | 17.00-18.00 |

**Foreign Iron Ore**

Cents per unit, c.i.f. Atlantic ports

| | |
|---|---|
| Swedish basic, 60-68% | 20.00 |
| N. African hematite (spot) | nom. 18.00-20.00 |
| Brazilian iron ore, 68-69% (spot) | 26.00-28.00 |

**Tungsten Ore**

Net ton unit, before duty

| | |
|---|---|
| Foreign, wolframite, good commercial quality | $33.75-$34.25 |
| Domestic, scheelite, mine | 63.00 |

**Manganese Ore**

Mn 48%, nearby, $1.06-$1.11 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 95c-$1.00.

**Chrome Ore**

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

*Indian and African*

| | |
|---|---|
| 48% 2.8:1 | nom. $45.00-$50.00 |
| 48% 3:1 | 42.00-44.00 |
| 48% no ratio | 34.00 |

*South African Transvaal*

| | |
|---|---|
| 44% no ratio | $19.00-$20.00 |
| 48% no ratio | 33.00-35.00 |

*Domestic*

Rail nearest seller

| | |
|---|---|
| 18% 3:1 | $39.00 |

**Molybdenum**

| | |
|---|---|
| Sulphide concentrate, per lb of Mo content, mines, unpacked | $1.00 |

**Antimony Ore**

Per unit of Sb content, c.i.f. seaboard

| | |
|---|---|
| 55-60% | $3.60-$3.85 |
| 60-65% | 3.85-4.00 |

**Vanadium Ore**

Cents per lb $V_2O_5$ content, deld. mills

| | |
|---|---|
| Domestic | 31.00 |

# Refractories

**Fire Clay Brick (per 1000)**

*High-Heat Duty:* Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

*Super-Duty:* Ironton, O., St. Louis, $150.

**Silica Brick (per 1000))**

*Standard:* Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

*Super Duty:* Hays, Sproul, Hawstone, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

**Semisilica Brick (per 1000)**

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

**Ladle Brick (per 1000)**

*Dry Pressed:* Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

**High-Alumina Brick (per 1000)**

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

**Sleeves (per 1000)**

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

**Nozzles (per 1000)**

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $258.

**Runners (per 1000)**

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

**Dolomite (per net ton)**

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding Bonne Terre, Mo., $14.

**Magnesite (per net ton)**

Domestic, dead-burned, bulk, ¼-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

# Metallurgical Coke

Price per net ton

**Beehive Ovens**

| | |
|---|---|
| Connellsville, furnace | $13.75-14.50 |
| Connellsville, foundry | 16.00-17.00 |

**Oven Foundry Coke**

| | |
|---|---|
| Birmingham, ovens | $25.65 |
| Cincinnati, deld. | 30.58 |
| Buffalo, ovens | 27.50 |
| Buffalo, deld. | 28.75 |
| Camden, N. J., ovens | 26.50 |
| Chicago, ovens | 27.00 |
| Chicago, deld. | 28.50 |
| Detroit, ovens | 27.50 |
| Detroit, deld. | 28.50 |
| Pontiac, deld. | 29.06 |
| Saginaw, deld. | 30.58 |
| Erie, Pa., ovens | 27.50 |
| Everett, Mass., ovens New England, deld. | *28.55 |
| Indianapolis, ovens | 26.75 |
| Kearny, N. J., ovens | 26.75 |
| Lone Star, Tex., ovens | 19.50 |
| Milwaukee, ovens | 27.50 |
| Neville Island, (Pittsburgh) Pa., ovens | 26.25 |
| Painesville, O., ovens | 27.50 |
| Cleveland, deld. | 29.43 |
| Philadelphia, ovens | 26.50 |
| Portsmouth, O., ovens | 24.75 |
| Cincinnati, deld. | 27.34 |
| St. Paul, ovens | 26.50 |
| Swedeland, Pa., ovens | 26.50 |
| Terre Haute, Ind., ovens | 26.75 |

*Or within $4.55 freight zone from works.

# Coal Chemicals

**Spot, cents per gallon, ovens**

| | |
|---|---|
| Pure benzene | 38.00 |
| Toluene, one deg. | 32.00-34.00 |
| Industrial xylene | 32.00-35.00 |

Per ton, bulk, ovens

| | |
|---|---|
| Ammonium sulphate | $42-$45 |
| Birmingham area | 42.00† |

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

# Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective $CaF_2$ content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

# Electrodes

Threaded with nipple, unboxed, f.o.b. plant

**GRAPHITE**

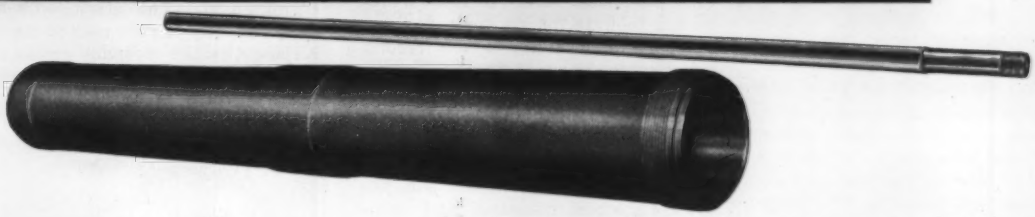
| Diam (Inches) | Length (Inches) | Per 100 lb |
|---|---|---|
| 2 | 24 | $52.50 |
| 2½ | 30 | 33.75 |
| 3 | 40 | 32.00 |
| 4 | 40 | 30.25 |
| 5½ | 40 | 30.00 |
| 6 | 60 | 27.25 |
| 7 | 60 | 26.75 |
| 8, 9, 10 | 60 | 24.25 |
| 12 | 72 | 27.25 |
| 14 | 60 | 23.50 |
| 16 | 72 | 22.50 |
| 17 | 60 | 23.00 |
| 18 | 72 | 22.50 |
| 20 | 72 | 22.25 |

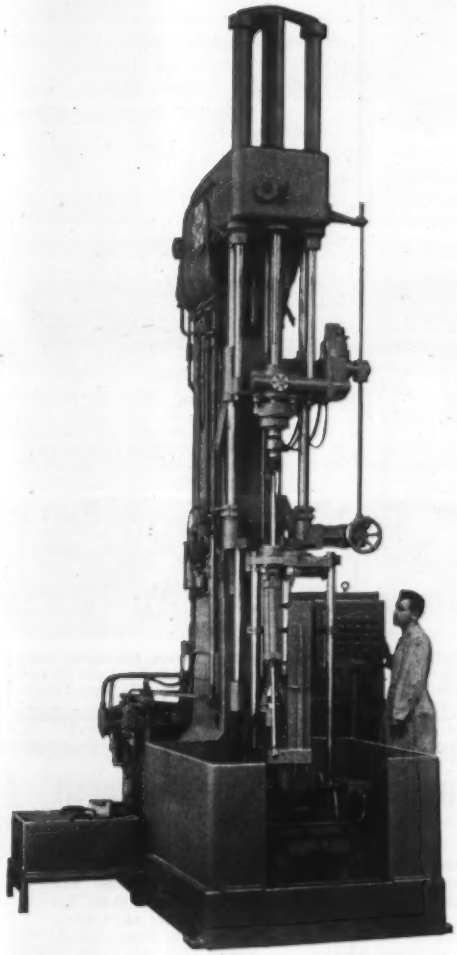
**CARBON**

| | | |
|---|---|---|
| 8 | 60 | 12.10 |
| 10 | 60 | 11.80 |
| 12 | 60 | 11.75 |
| 14 | 60 | 11.70 |
| 14 | 72 | 10.85 |
| 17 | 60 | 10.75 |
| 17 | 72 | 10.35 |
| 20 | 84 | 10.30 |
| 20 | 90 | 10.10 |
| 24 | 72, 84 | 10.30 |
| 24 | 96 | 10.05 |
| 30 | 84 | 10.20 |
| 40, 35 | 110 | 9.90 |
| 40 | 100 | 9.90 |

# MICROHONING*...

## *Efficient Stock Removal*
with
## LOW-VELOCITY ABRADING





INCREASINGLY, process engineers are recognizing Microhoning's low-velocity abrading technique as a means of combining efficient stock removal with precision.

The Brooklyn Works of American Machine & Foundry Company, in the precision-manufacture of recoil mechanisms for artillery weapons, required a process that would most efficiently remove substantial amounts of stock and generate functional surface characteristics on the I.D. of recoil cylinders and O.D. of piston rods. After extensive study of available methods, AMF selected Microhoning as the most productive and economical process for obtaining desired results.

The floating piston in the recoil cylinder has nitrogen gas on one side and hydraulic oil on the other. Because silver ring seals are used, any error in geometry or roughness of cylinder or rod surfaces will induce deformation or scoring of silver rings and break these important seals.

The largest cylinder processed by AMF to date is for a 75 mm gun and has a bore diameter of 4.750 inches and a length of 46 inches. Piston rods for this gun are 1.375 inches in diameter and 56 inches long. Both I.D. and O.D. operations are on the same Microhoning machine—Model 450 Hydrohoner.

The Microhoning process efficiently removes up to .026 inch of stock from cylinders and .006 inch from rods to correct waviness, taper and out-of-roundness. A geometric tolerance of .0001 inch is held while obtaining a 1.5 microinch finish.

Working closely with AMF manufacturing personnel, Micromatic developed fixtures and tooling that minimize changeover time. The fixture for the cylinder is mounted on an indexing table so it is simply indexed away from the spindle while the rod is being Microhoned. You, too, can solve your precision stock-removal problems through application of Microhoning—the low-velocity abrading process.

*For further information write for CROSS-HATCH, Vol. 7 No. 5*

***MICROHONING=**
**Stock Removal + Geometry + Size Control + Surface Finish**

# MICROMATIC HONE CORPORATION

8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

(*Concluded from page* 146)

supply. Bars are still required in large quantities. Demand for sheet is less pressing than it was in the hectic periods of 1955.

## 1955 Steel Shipments Tops

Finished steel shipments hit a record 84,717,444 net tons in 1955, reports the American Iron & Steel Institute. This tops 1954 shipments by nearly 21.6 million tons, and the record movement in 1953 by 4.6 million.

Records were set in concrete reinforcing bars, standard pipe, oil country goods, electrolytic tin plate and steel sheets.

Movement of cold-rolled sheets, 15,167,629 net tons, accounted for 17.9 per cent of total shipments, and exceeded the 1953 record by nearly 3.9 million. Hot-rolled sheet shipments, 9,430,711 tons, were 11.1 per cent of the total and topped the 1951 record total by 1.2 million tons. The 2,864,497 tons of galvanized sheets moved last year represented a gain of 500,000 tons over the former record, set in 1954, while electrolytic tin plate shipments, 4,503,637 tons, topped the prior record, set in 1954, by 800,000 tons.

The five largest market classifications for finished products last year were: Automotive, warehouses, construction, containers, machinery, industrial equipment and tools—in that order. All five received record tonnages, as did electrical machinery and equipment, appliances, utensils and cutlery and other domestic and commercial equipment.

Automotive received 18,721,880 tons, 23.1 per cent of total 1955 steel shipments, and 4 million tons more than the former record in 1953. Warehouses took 15,758,004 tons, 19.4 per cent of the total for a new record. Construction received 13,663,939 tons; containers, 6,723,074; machinery, industrial equipment and tools, 4,699,024; railroad transportation, 3,520,849; electrical machinery and equipment, 2,291,866; appliances, etc., 2,199,114; other domestic and commercial equipment, 2,189,416 tons.

## Pig Iron . . .

**Pig Iron Prices, Page 141**

Foundries are inquiring actively for iron. In most instances, supply is adequate to meet needs fully. Foundries whose chief customers are in the automotive industry are experiencing a slowdown; those serving the machine tool industry are increasingly busy. Toolmakers are beginning to produce units specified in orders booked at the Chicago show.

In the East, operational difficulties at certain producing points have retarded deliveries of iron, but consumers generally have been able to cover their needs elsewhere. Prices are of less concern to buyers than they were a few weeks ago.

Work is under way on a blast furnace for U. S. Pipe & Foundry Co., Birmingham. The stack will have daily capacity of 1000 tons of pig iron. Adjacent to the company's coke oven plant at North Birmingham, Ala., the furnace will be completed in about 16 months. Rust Engineering Co., Pittsburgh, has the contract for general engineering and construction.

## Enamel Frit Prices Raised

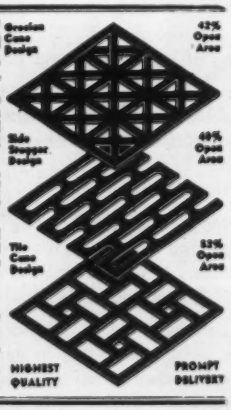
Ferro Corp., Cleveland, increased prices on porcelain enamel frits 4 to 5.5 per cent (effective Feb. 8). Since the last price increase (April, 1953), the company has granted two wage increases, and there have been numerous increases in the prices of raw materials, including borax and titanium oxide, which are important ingredients in the firm's products.


**PERFORATED METALS**
**FOR EVERY INDUSTRIAL USE**

The "Ornamental" light-gauge designs here illustrated are only a few of the many you can choose from in our new Catalog 39 and we are always pleased to quote on original designs or special work of any kind.

For larger unit-openings, using metals up to ¼" in thickness, we offer a wide variety of equally attractive designs in our Catalog 36 on Diamond Architectural Grilles.

Send us your blueprints. We are equipped to fabricate special sections to any desired extent and welcome opportunities to make money-saving suggestions.

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BROWNING ELECTRIC TRAVELING CRANES AND HOISTS up to 125-TON CAPACITY

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**famous** for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

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Pacific Coast Representative: *A. C. Berbringer, Inc., 334 N. San Pedro St., Los. Angeles, California.* Canada: *F. F. Barber Machinery Co., Toronto, Canada.*



MASTER MAKERS OF
FINE BEARING METALS
SINCE 1860

*A. W. Cadman Mfg. Co.*

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**INTRODUCTION TO THE STUDY OF HEAT TREATMENT OF METALLURGICAL PRODUCTS**
***By Albert Portevin***

**Fundamental knowledge and essential principles of heat treatment of steel are presented in simple and understandable manner. Research engineers, metallurgical students and steel plant metallurgists engaged in metallurgical investigations and the heat treatment of ferrous and non-ferrous metals will find this book of inestimable value.**

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## Scrap . . .

Scrap Prices, Page 154

**Philadelphia** — Further easing is noted in scrap. Based on limited buying, No. 1 heavy melting, No. 1 bundles and No. 1 busheling are lower at $51-$52, delivered. No. 2 heavy melting is down to $45-$46, and No. 2 bundles to $41-$42. Low phos structurals and plates have eased to $55-$57, couplers, springs and wheels to $58, and rail crops, 2 ft and under, to $64-$65.


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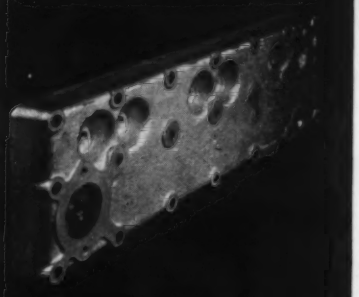

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In cast, No. 1 cupola has dropped to $50, delivered, on sizable buying by a district pipe mill. Heavy breakable is the only item on the list that advanced, some business being placed at $54, delivered. Drop broken machinery has eased $1 to $56.

**Pittsburgh**—Scrap prices have stabilized. Quotations for No. 1 heavy melting are uniform at $51. Sellers resist a downtrend reflected in sales at $1 a ton lower last week. Nickel-bearing stainless scrap has eased slightly from January levels. Mills are buying 18-8 bundles and solids at $350 from brokers. The price of 18-8 turnings is $105 lower. Railroad scrap lists closed last week. Prices were $2 to $3 lower than late January levels. No. 1 railroad heavy melting is quoted at $57.

**Buffalo**—With the exception of No. 1 material, prices on steelmaking and blast furnace grades of scrap dropped $3 a ton on sales of approximately 20,000 tons to one mill here. No. 2 heavy melting declined to $40-$41 and No. 2 bundles to $37-$38. No. 1 material was off $1 to $46-$48. Cast grades held steady.

**Cleveland**—There was a further decline of $1 per ton on the steelmaking grades of scrap on a number of small area sales last week. No. 1 heavy melting is quoted at $49-$50. One sale of cut structurals and plate brought the market on that item down about $5 a ton to $54-$55. In general, the market is quiet.

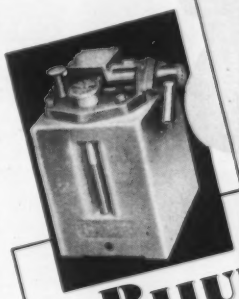
**Boston**—Prices on both the steel and cast iron grades of scrap continue to sag. No. 1 heavy melting is off another $2 per ton on shipments to eastern Pennsylvania and district mills. New buying is slow, with shipments against old orders active but well along. Export buying, dock delivery, is restricted by congestion of unloaded cars.

**New York**—Brokers have reduced buying prices on open-hearth steel scrap and the cast grades. Reflecting easier supply, they are offering $44-$45 for No. 1 heavy melting and No. 1 bundles, and $41-$42 for No. 2 heavy melting. No. 2 bundles are unchanged at $36-$38. No. 1 cupola is off sharply to $43-$44, and unstripped motor blocks to $30-$32. Heavy breakable is down $1 to $45-$46.

**Cincinnati**—Continued softness in prices is noted here. Mills hold substantial inventories and are making only token purchases. Foundry grades of scrap are beginning to show easiness.

(*Please turn to page* 156)


YOUR SILENT PARTNER



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# Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

## STEELMAKING SCRAP COMPOSITE

| | |
|---|---|
| Feb. 8 | $50.33 |
| Feb. 1 | 50.50 |
| Jan. Avg. | 52.17 |
| Feb. 1955 | 36.79 |
| Feb. 1951 | 44.00 |

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

### PITTSBURGH

| | |
|---|---|
| *No. 1 heavy melting* | *50.00-51.00* |
| No. 2 heavy melting | 44.00-45.00 |
| *No. 1 bundles* | *50.00-51.00* |
| No. 2 bundles | 41.00-42.00 |
| *No. 1 busheling* | *50.00-51.00* |
| Machine shop turnings | 35.00-36.00 |
| Mixed borings, turnings | 35.00-36.00 |
| Short shovel turnings | 38.00-39.00 |
| Cast iron borings | 38.00-39.00 |
| Cut structurals, 3 ft lengths | 58.00-59.00 |
| Heavy turnings | 45.00-46.00 |
| Punchings & plate scrap | 58.00-59.00 |
| Electric furnace bundles | 53.00-54.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 48.00-49.00 |
| Charging box cast | 45.00-46.00 |
| Heavy breakable cast | 45.00-46.00 |
| Unstripped motor blocks | 32.00-33.00 |
| No. 1 machinery cast | 54.00-55.00 |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt* | *56.00-57.00* |
| *Rails, 2 ft and under* | *66.00-67.00* |
| *Rails, 18 in. and under* | *67.00-68.00* |
| *Rails, random lengths* | *62.00-63.00* |
| *Railroad specialties* | *61.00-62.00* |

Stainless Steel Scrap

| | |
|---|---|
| *18-8 bundles & solids* | *340.00-350.00* |
| 18-8 turnings | 235.00-245.00 |
| 430 bundles & solids | 110.00-120.00 |
| 430 turnings | 60.00-65.00 |

### CLEVELAND

| | |
|---|---|
| *No. 1 heavy melting* | *49.00-50.00* |
| *No. 2 heavy melting* | *43.00-44.00* |
| *No. 1 bundles* | *49.00-50.00* |
| No. 2 bundles | 38.00-39.00 |
| *No. 1 busheling* | *49.00-50.00* |
| *Machine shop turnings* | *29.00-30.00* |
| *Mixed borings, turnings* | *33.50-34.50* |
| *Short shovel turnings* | *33.50-34.50* |
| *Cast iron borings* | *33.50-34.50* |
| Low phos. | 55.00-56.00 |
| *Cut structural plates 2 ft and under* | *54.00-55.00* |
| Alloy free, short shovel turnings | 37.00-38.00 |
| *Electric furnace bundles* | *49.50-50.50* |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *54.00-55.00* |
| Charging box cast | 47.00-48.00 |
| Stove plate | 53.00-54.00 |
| Heavy breakable cast | 46.00-47.00 |
| Unstripped motor blocks | 36.00-37.00 |
| Brake shoes | 41.00-42.00 |
| Clean auto cast | 53.00-54.00 |
| Burnt cast | 41.00-42.00 |
| Drop broken machinery | 55.00-56.00 |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt* | *53.00-54.00* |
| R.R. malleable | 59.00-60.00 |
| Rails, 2 ft and under | 71.00-72.00 |
| Rails, 18 in. and under | 72.00-73.00 |
| Rails, random lengths | 65.00-66.00 |
| Cast steel | 60.00-61.00 |
| Railroad specialties | 60.00-61.00 |
| Uncut tires | 60.00-61.00 |
| Angles, splice bars | 66.00-67.00 |
| Rails, rerolling | 71.00-72.00 |

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| 18-8 bundles, solids | 340.00-350.00 |
| 18-8 turnings | 200.00-210.00 |
| 430 clips, bundles, solids | 105.00-115.00 |
| 430 turnings | 55.00-65.00 |

### YOUNGSTOWN

| | |
|---|---|
| No. 1 heavy melting | 52.50-53.50 |
| No. 2 heavy melting | 44.00-45.00 |
| No. 1 bundles | 52.50-53.50 |
| No. 2 bundles | 39.00-40.00 |
| No. 1 busheling | 52.50-53.50 |
| Machine shop turnings | 31.50-32.50 |
| Short shovel turnings | 36.00-37.00 |
| Cast iron borings | 36.00-37.00 |
| Low phos. | 54.00-55.00 |
| Electric furnace bundles | 54.00-55.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 57.00-58.00 |

### CHICAGO

| | |
|---|---|
| No. 1 heavy melting | 48.00-50.00 |
| No. 2 heavy melting | 37.00-38.00 |
| *No. 1 dealer bundles* | *46.00-47.00* |
| No. 1 factory bundles | 50.00-51.00 |
| No. 2 bundles | 37.00-38.00 |
| No. 1 busheling | 48.00-50.00 |
| *Machine shop turnings* | *25.00-26.00* |
| *Mixed borings, turnings* | *27.00-28.00* |
| *Short shovel turnings* | *27.00-28.00* |
| *Cast iron borings* | *27.00-28.00* |
| Cut structurals, 3 ft | 54.00-55.00 |
| Punchings & plate scrap | 55.00-56.00 |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *46.00-47.00* |
| *Stove plate* | *38.00-39.00* |
| *Unstripped motor blocks* | *36.00-37.00* |
| *Clean auto cast* | *51.00-52.00* |
| *Drop broken machinery* | *51.00-52.00* |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt* | *50.00-51.00* |
| *R.R. malleable* | *59.00-61.00* |
| *Rails, 2 ft and under* | *66.00-67.00* |
| *Rails, 18 in. and under* | *65.00-66.00* |
| Angles, splice bars | 65.00-66.00 |
| *Rails, rerolling* | *66.00-67.00* |

Stainless Steel Scrap

| | |
|---|---|
| 18-8 bundles & solids | 335.00-350.00 |
| 18-8 turnings | 240.00-250.00 |
| 430 bundles & solids | 110.00-115.00 |
| 430 turnings | 50.00-55.00 |

### DETROIT

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| *No. 1 heavy melting* | *46.00* |
| *No. 2 heavy melting* | *33.00* |
| *No. 1 bundles* | *46.00* |
| *No. 2 bundles* | *33.00* |
| *No. 1 busheling* | *46.00* |
| *Machine shop turnings* | *22.00* |
| *Mixed borings, turnings* | *22.00* |
| *Short shovel turnings* | *25.00* |
| Punchings & plate scrap | 55.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 43.00 |
| Charging box cast | 37.00 |
| Stove plate | 37.00 |
| Heavy breakable | 35.00 |
| Unstripped motor blocks | 25.00 |
| Clean auto cast | 46.00 |
| Malleable | 42.00 |

### BIRMINGHAM

| | |
|---|---|
| *No. 1 heavy melting* | *43.00-44.00* |
| *No. 2 heavy melting* | *40.00-41.00* |
| *No. 1 bundles* | *43.00-44.00* |
| *No. 2 bundles* | *32.00-33.00* |
| *No. 1 busheling* | *43.00-44.00* |
| Cast iron borings | 19.00-20.00 |
| Short shovel turnings | 30.00-31.00 |
| Machine shop turnings | 29.00-30.00 |
| *Electric furnace bundles* | *46.00-47.00* |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 47.50-48.00 |
| Stove plate | 44.50-45.50 |
| *Bar crops and plate* | *51.00-52.00* |
| *Structural & plate, 2 ft* | *51.00-52.00* |
| Unstripped motor blocks | 39.00-40.00 |
| Charging box cast | 32.00-33.00 |
| No. 1 wheels | 39.00-40.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 51.00-52.00 |
| Rails, 18-in. and under | 64.00-65.00 |
| *Rails, rerolling* | *62.00-63.00* |
| Rails, random lengths | 59.00-60.00 |
| *Angles, splice bars* | *57.00-58.00* |

### PHILADELPHIA

| | |
|---|---|
| *No. 1 heavy melting* | *51.00-52.00* |
| *No. 2 heavy melting* | *45.00-46.00* |
| *No. 1 bundles* | *51.00-52.00* |
| *No. 2 bundles* | *41.00-42.00* |
| *No. 1 busheling* | *51.00-52.00* |
| Electric furnace bundles | 54.00 |
| Machine shop turnings | 37.50 |
| Mixed borings, turnings | 37.50 |
| Short shovel turnings | 40.00 |
| Heavy turnings | 49.00† |
| *Structurals & plate* | *55.00-57.00* |
| *Couplers, springs, wheels* | *58.00†* |
| *Rail crops, 2 ft & under* | *64.00-65.00†* |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *50.00* |
| Malleable | 68.00 |
| *Heavy breakable cast* | *54.00* |
| *Drop broken machinery* | *56.00* |

†Nominal

### NEW YORK

(Brokers' buying prices)

| | |
|---|---|
| *No. 1 heavy melting* | *44.00-45.00* |
| *No. 2 heavy melting* | *41.00-42.00* |
| *No. 1 bundles* | *44.00-45.00* |
| No. 2 bundles | 36.00-38.00 |
| Machine shop turnings | 26.00-27.00 |
| Mixed borings, turnings | 29.00-30.00 |
| Short shovel turnings | 30.00-31.00 |
| Low phos. (structural & plate) | 48.00-50.00 |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *43.00-44.00* |
| *Unstripped motor blocks* | *30.00-32.00* |
| *Heavy breakable* | *45.00-46.00* |

Stainless Steel

| | |
|---|---|
| 18-8 sheets, clips solids | 320.00-325.00 |
| 18-8 borings, turnings | 150.00-160.00 |
| 430 sheets, clips, solids | 120.00-125.00 |
| 410 sheets, clips, solids | 100.00-105.00 |

### BOSTON

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| *No. 1 heavy melting* | *41.00-41.50* |
| *No. 2 heavy melting* | *32.00-33.00* |
| *No. 1 bundles* | *41.00-41.50* |
| *No. 2 bundles* | *31.00-31.50* |
| Machine shop turnings | 26.00-26.50 |
| Mixed borings, turnings | 27.00-27.50 |
| *Short shovel turnings* | *29.00-29.50* |
| *No. 1 cast* | *41.00-42.00* |
| *Mixed cupola cast* | *39.00-40.00* |
| *No. 1 machinery cast* | *45.00-46.00* |

### BUFFALO

| | |
|---|---|
| *No. 1 heavy melting* | *46.00-47.00* |
| *No. 2 heavy melting* | *40.00-41.00* |
| *No. 1 bundles* | *46.00-47.00* |
| *No. 2 bundles* | *37.00-38.00* |
| *No. 1 busheling* | *46.00-47.00* |
| *Mixed borings, turnings* | *29.00-30.00* |
| *Machine shop turnings* | *28.00-29.00* |
| *Short shovel turnings* | *30.00-31.00* |
| *Cast iron borings* | *30.00-31.00* |
| *Low phos.* | *46.00-47.00* |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 46.00-47.00 |
| No. 1 machinery | 49.00-50.00 |

Railroad Scrap

| | |
|---|---|
| *Rails, random lengths* | *60.00-61.00* |
| *Rails, 3 ft and under* | *62.00-63.00* |
| *Railroad specialties* | *54.00-55.00* |

### CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| No. 1 heavy melting | 45.00-46.00 |
| *No. 2 heavy melting* | *38.00-39.00* |
| No. 1 bundles | 45.00-46.00 |
| *No. 2 bundles* | *36.00-37.00* |
| No. 1 busheling | 45.00-46.00 |
| Machine shop turnings | 30.50 |
| Mixed borings, turnings | 30.50-31.00 |
| Short shovel turnings | 33.50 |
| Cast iron borings | 30.50-31.00 |
| *Low phos., 18 in.* | *54.00-55.00* |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *44.00-45.00* |
| *Heavy breakable cast* | *42.00-43.00* |
| *Charging box cast* | *42.00-43.00* |
| *Drop broken machinery* | *54.00-55.00* |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt* | *51.00-52.00* |
| Rails, 18 in. and under | 66.00-67.00 |
| Rails, random lengths | 59.00-60.00 |

### ST. LOUIS

(Brokers' buying prices)

| | |
|---|---|
| No. 1 heavy melting | 40.50 |
| No. 2 heavy melting | 38.00 |
| No. 1 bundles | 40.50 |
| No. 2 bundles | 34.00 |
| No. 1 busheling | 40.50 |
| Machine shop turnings | 28.00 |
| Short shovel turnings | 28.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 47.00 |
| Charging box cast | 41.00 |
| Heavy breakable cast | 39.00 |
| Unstripped motor blocks | 39.00 |
| Brake shoes | 43.00 |
| Clean auto cast | 48.00 |
| Stove plate | 41.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 50.50 |
| Rails, 18 in. and under | 66.00 |
| Rails, random lengths | 60.00 |
| *Rails, rerolling* | *66.00* |
| *Angles, splice bars* | *54.00* |

### SEATTLE

| | |
|---|---|
| *No. 1 heavy melting* | *42.00* |
| *No. 2 heavy melting* | *38.00* |
| *No. 1 bundles* | *34.00* |
| *No. 2 bundles* | *32.00* |
| No. 3 bundles | 25.00 |
| Machine shop turnings | 15.00-16.00 |
| Mixed borings, turnings | 15.00-16.00 |
| Short shovel turnings | 15.00-16.00 |
| Electric furnace, bundles | 55.00 |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| *No. 1 cupola* | *40.00-43.00* |
| *Heavy breakable cast* | *38.00* |
| No. 1 wheels | 35.00 |
| Unstripped motor blocks | 33.00 |
| Clean motor blocks | 40.00 |
| Stove plate (f.o.b. plant) | 35.00 |
| Brake shoes | 35.00 |

Railroad Scrap

| | |
|---|---|
| Rails, random lengths | 33.00 |

### LOS ANGELES

| | |
|---|---|
| No. 1 heavy melting | 42.00 |
| No. 2 heavy melting | 38.00 |
| No. 1 bundles | 41.00 |
| No. 2 bundles | 33.00 |
| Machine shop turnings | 20.00 |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 48.00 |

### SAN FRANCISCO

| | |
|---|---|
| *No. 1 heavy melting* | *40.00* |
| *No. 2 heavy melting* | *35.00* |
| *No. 1 bundles* | *39.00* |
| *No. 2 bundles* | *35.00* |
| *No. 1 busheling* | *40.00* |
| Machine shop turnings | 23.00 |
| Mixed borings, turnings | 23.00 |
| Cast iron borings | 23.00 |
| Short shovel turnings | 25.00 |
| *Cut structurals* | *49.00* |
| *Heavy turnings* | *23.00* |
| Punchings & plate scrap | 44.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 50.00 |
| Charging box cast | 35.00 |
| Stove plate | 39.00 |
| Heavy breakable cast | 36.00 |
| Unstripped motor blocks | 32.00 |
| Brake shoes | 35.00 |
| Clean auto cast | 50.00 |
| No. 1 wheels | 39.00 |
| Burnt cast | 23.00 |
| Drop broken machinery | 50.00 |

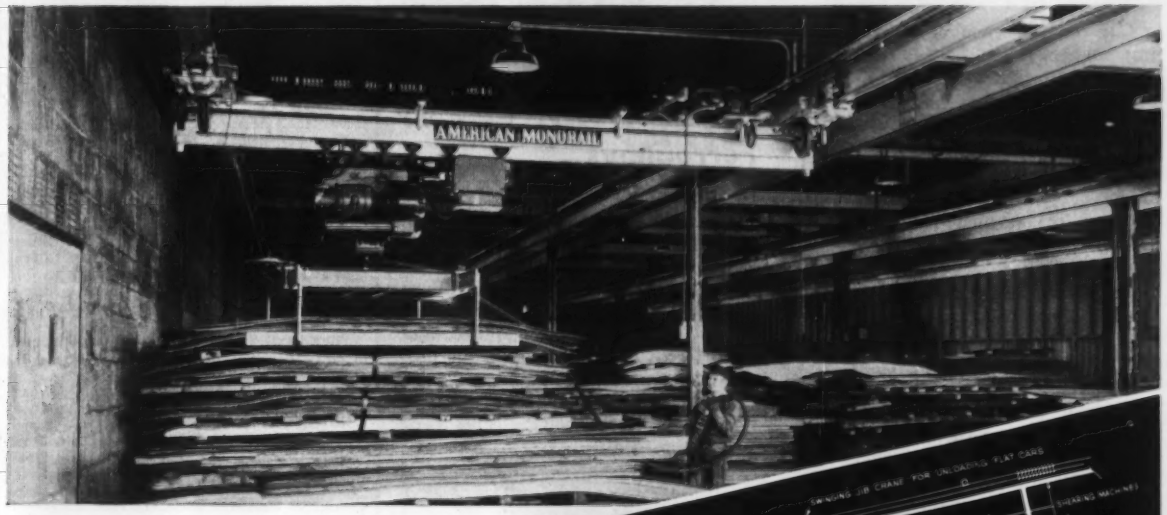
### HAMILTON, ONT.

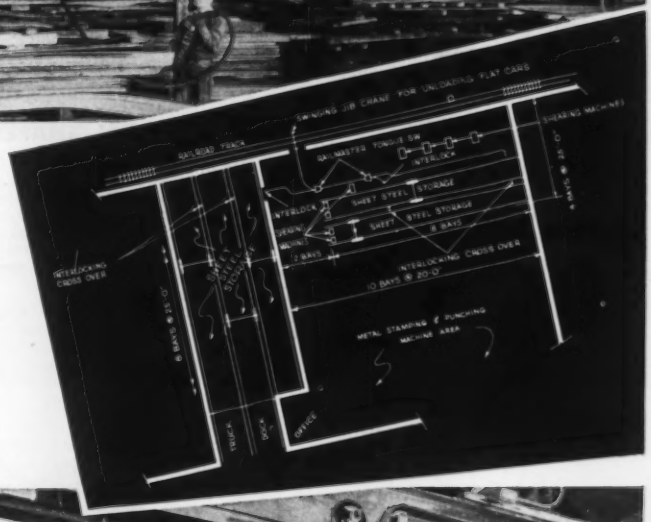
| | |
|---|---|
| No. 1 heavy melting | 45.50 |
| No. 2 heavy melting | 41.50 |
| No. 1 bundles | 45.50 |
| No. 2 bundles | 38.00 |
| Mixed steel scrap | 38.00 |
| Mixed borings, turnings | 19.00 |
| Rails, remelting | 54.50 |
| Bushelling, new factory: Prepared | 43.50 |
| Unprepared | 39.50 |
| Short steel turnings | 27.50 |

Cast Iron Grades†

| | |
|---|---|
| No. 1 machinery cast | 42.00-45.00 |

†F.o.b., shipping point.

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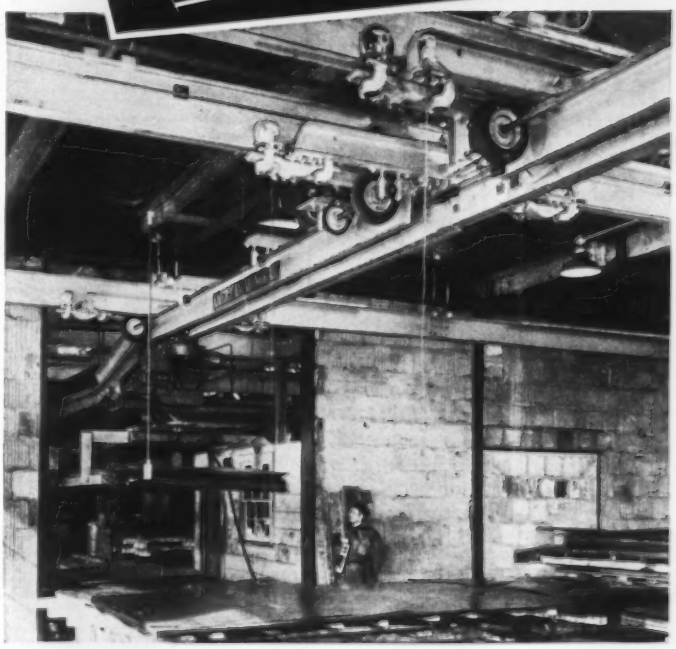

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[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

(*Concluded from page* 153)

**Chicago**—Absence of sizable buying makes for a soft tone in the scrap market. No. 1 dealer bundles, No. 1 railroad heavy melting and rerolling rails are down $1 a ton on the basis of small sales. The cast grades are lower by about $2 a ton. Some of this latter easiness is attributed to lessened demand in the area because of a strike at Deere & Co.

**St. Louis**—Mills are running near capacity, but their scrap inventories are large, and they are not actively in the market for new tonnage. As a result, prices remain weak and are expected to dip further.

**Birmingham**—Although buying of steel scrap is limited, the market continues to show signs of weakness. Brokers say prices vary as much as $3 a ton on the limited orders placed. In the Atlanta area, orders have been filled quickly at current prices.

**San Francisco**—Steel scrap prices have taken a substantial drop. Decreases, from $3 to $7 a ton, are attributed to oversupply and to a Japanese buying cartel which has effected a lower price scale on the West Coast.

**Seattle**—Further price declines in the principal grades of scrap were noted last week. Leading dealers are quoting: No. 1 heavy melting, $42; No. 2, $38; No. 2 bundles, $32; turnings, $20; No. 1 cupola, $40-$43; heavy breakable, $38. Foreign demand is slower. Country shippers are holding tonnage back.

## Ferroalloys . . .

**Ferroalloy Prices, Page 148**

The Electro Metallurgical Co., a division of Union Carbide & Carbon Corp., New York, has issued a 32-page revised price list for ferroalloys and metals. It contains the analyses, available sizes and prices for over 50 different products used in the production of steel and iron. Also included is information on pricing and sizing and a map showing sales territories, the location of company sales offices, plants and warehouses.

## STRUCTURAL SHAPES . . .

### STRUCTURAL STEEL PLACED

14,750 tons, superstructure, two main cantilever spans, two anchor spans, center tower spans and girder approaches, bridge of parallel Carquinez structure, Contra Costa and Solaon counties, California, to American Bridge Division, U. S. Steel Corp., San Francisco.

8500 tons, superstructure, deck truss spans, Greater New Orleans bridge, Mississippi river, to Bethlehem Steel Co., Bethlehem, Pa.

8200 tons, superstructure, main span and two approaches, Missouri river bridge, St. Louis and St. Charles counties, Missouri, to Stupp Bros. Bridge & Iron Co., St. Louis.

8000 tons, power plant, Philadelphia Electric Co., Philadelphia, to Bethlehem Steel Co. Bethlehem, Pa.

3620 tons, state bridge work, Beaver county, Pa., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

2600 tons, state bridge, Westmoreland county, Pa., through Lycoming Construction Co., general contractor, to the New York Shipbuilding Co., Camden, N. J.

1000 tons, steam plant, Philadelphia Electric Co., Philadelphia, to Belmont Iron Works, Eddystone, Pa.

860 tons, Federal Reserve Bank, Louisville, to International Steel Co., Evansville, Ind.; F. W. Owens Co., Louisville, general contractor.

606 tons, bridge material for Alaska Railroad, to Bethlehem Pacific Coast Steel Corp., Seattle.

500 tons, Episcopal hospital, Philadelphia, to Belmont Iron Works, Eddystone, Pa.

485 tons, woolen plant, Albany Felt Co., St. Stephen, S. C., to Owen Steel Co., Columbia, S. C.; Daniel Construction Co., Greenville, S. C., general contractor.

480 tons, dehumidified warehouse, naval construction, battalion center, Davisville, R. I., to Groisser & Shlager Iron Works, Somerville, Mass.; Ayers-Hagan-Booth, Providence, R. I., general contractor; reinforcing bars to Plantations Steel Co., Providence.

470 tons, state highway bridges, Manatee county, Florida, (250) Nashville Bridge Co., Nashville, Tenn., (220) Bushnell Steel Co., Jacksonville, Fla.; Hardaway Contracting Co., Columbus, Ga., general contractor.

380 tons, Supreme Court building, New Orleans, to Jones & Laughlin Steel Corp., New Orleans; R. P. Farnsworth & Co. Inc., New Orleans, general contractor.

235 tons, gymnasium and classroom addition, Mountain View school, South Portland, Me., to Bancroft & Martin Rolling Mills Co., South Portland; C. Profenno Co., Portland, Me., general contractor.

165 tons, state stringer bridges, Blackstone, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Westcott Construction Co., North Attleboro, Mass.; 50 tons, reinforcing bars, Northern Steel Inc., Medford, Mass.

140 tons, high school, Littleton, Mass., to Waghorne-Brown Co. (Bethlehem Fabricators Inc.), Boston; Tornabene Bros. Co., Newton Upper Falls, Mass., general contractor.

125 tons, state highway bridge, Woolwich, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; the Bridge Construction Co., Augusta, Me., general contractor; 100 tons, steel piles and reinforcing bars, to same shop.

100 tons or more, antenna microwave tower, near Everett, Wash., to Joseph Fought Co., Portland, Oreg., by Pacific Telephone & Telegraph Co.

### STRUCTURAL STEEL PENDING

4000 tons, 8-plane hangar for Boeing Airplane Co., Moses Lake, Wash.; new bid date Mar. 8, Seattle.

2700 tons, 11 grade separation structures, Connecticut turnpike, Project 312-01, Bridgeport and Stratford, Conn.; bids Feb. 20, Hartford, Conn.; also 1865 tons, concrete reinforcing bars; 425 tons, mat reinforcing and 102,500 linear feet of steel pipe piling.

2635 tons, 15 grade separations and three stream crossing bridges, Connecticut turnpike, Project 321-01, Guilford-Clinton-Madison-Westbrook, Conn.; bids Feb. 20, Hartford, Conn.; also 1715 tons, concrete reinforcing bars, and 1350 tons, steel piles.

2000 tons, city-county building, Tacoma, Wash.; bids Feb. 14.

500 tons, 685-ft Oregon state bridge at Nyssa, Oreg.; Hansen & Parr, Spokane, Wash., low at $499,227.

325 tons, state bridges, relocation 3, Plymouth-Bourne, Mass.; J. F. White Contracting Co., Westwood, Mass., low on general contract.

220 tons, Washington state Thurston county girder bridge; bids to Olympia, Wash., Feb. 21.

200 tons, state highway bridge, Coventry-West Warwick, R. I.; bids Feb. 15, Providence, R. I.

150 tons, stoplog, gates, frames, etc., Gorge dam, Skagit project; Pacific Car & Foundry Co., Seattle, low at $18,964 and $97,614 on two schedules to the city of Seattle.

150 tons, state bridge work, Lackawanna county, Pa.; bids Feb. 24.

150 tons, state bridge work, Northumberland

don't overlook this diamond . . . it stands for

P&A
ESTABLISHED 1869

QUALITY
BRASS
BRONZE
NICKEL SILVER

Sheet, Strip, Mill Coils or Cut to Length

THE PLUME & ATWOOD MANUFACTURING COMPANY
Thomaston, Conn.

## INDUSTRIAL ENGINEERING OPPORTUNITIES

For QUALITY CONTROL ENGINEERS with training or experience in the field of process analysis and statistical analysis.

For PRODUCTION RESEARCH ENGINEERS who have experience in operational analysis, operating procedures development, material handling, product protection and materials research.

We may have the opening you are looking for to provide you with the opportunity to fully utilize your capacity and meet your needs in an expanding progressive organization.

Must be willing to relocate in SO. CALIF. at Fontana plant of the KAISER STEEL CORPORATION.

Send complete resume including education, experience and salary requirements to: Employment Manager.

**KAISER STEEL CORPORATION**
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Extruded Brass Angles 1½" x 1½" x ⅛". Priced at 38 cents per pound.

| QUANTITY | LENGTH |
|---|---|
| 36 | 14'1" |
| 36 | 7'8" |
| 80 | 14'7" |
| 175 | 8'2" |
| 36 | 13'7" |
| 67 | 7'3" |
| 6 | 10'8" |
| 5 | 11'1" |
| 14 | 8'7" |
| 4 | 11'7" |

**WIND TURBINE COMPANY**
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Mr. Burke

# EXPERIENCED YOUNG DIE CASTING ENGINEERS

### COLLEGE GRADUATES OR EQUIVALENT DIE CASTING PRODUCTION OR ENGINEERING EXPERIENCE

This is an opportunity to work on major projects with some of America's most successful product engineers.

The company is Doehler Jarvis, a large and vigorous Division of National Lead Company.

We are engaged in the production and finishing of aluminum, zinc, magnesium, and brass die castings which are used extensively in industry.

Salary will be commensurate with ability — our fringe benefits reflect an enlightened company policy.

Our plants are modern and are located in first rate communities. High professional standards are followed.

To arrange an interview please contact any of the following:

| | |
|---|---|
| Toledo, Ohio | W. F. Carman—Smead Avenue |
| Grand Rapids, Michigan | M. H. Swifink—Cottage Grove |
| Pottstown, Pennsylvania | E. R. Rothenberger—Washington Street |
| Batavia, New York | T. A. Fenton—Robertson Street |
| New York City | R. M. Cox—111 Broadway |

**DOEHLER-JARVIS DIVISION**
**NATIONAL LEAD COMPANY**
General Offices—Toledo, Ohio

## CLASSIFIED

### Representatives Wanted

MANUFACTURERS REPRESENTATIVE calling on steel fabricators in Mid-West to replace representative who is retiring. Our machinery has 25-year history in both large and small structural shops—also manufacturing plants. Exclusive contract to organization selected. Will consider machine tool distributor or dealer. Address Box 371, STEEL, Penton Bldg., Cleveland 13, Ohio.

### Help Wanted

PRODUCTION SUPERINTENDENT

Leading tool steel manufacturer seeks Production Superintendent experienced in maintenance or production in Merchant Rolling Mills. Minimum of three to five year experience and a mechanical or metallurgical education desired. Complete employee benefits and excellent advancement opportunities. Send full resume to Box 367, STEEL, Penton Bldg., Cleveland 13, Ohio.

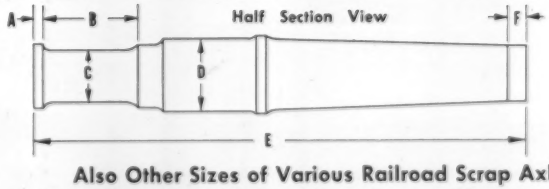
SUPERINTENDENT OF BILLET CONDITIONING

Leading tool steel manufacturer seeks superintendent of billet conditioning with several years experience on work involving conditioning of billets. Must be able to develop better grinding techniques and be capable of handling personnel in a department of approximately 150 people. Complete employee benefits and excellent advancement opportunities. Send full resume to Box 368, STEEL, Penton Bldg., Cleveland 13, Ohio.

ESTIMATOR experienced in material take-off for 34-year old structural steel fabricator located in Pittsburgh, Pa., district. Expanding our staff, and our employees know about this ad. All replies held confidential, and please send full resume. Address Box 370, STEEL, Penton Bldg., Cleveland 13, Ohio.

## FOR SALE

# SCRAP STEEL FREIGHT CAR AXLES




| | |
|---|---|
| A | 3/16" |
| B | 11 11/16" |
| C | 5 1/2" |
| D | 7 3/8" |
| E | 7'-6 3/4" |
| F | 6 5/16" |

**Also Other Sizes of Various Railroad Scrap Axles.**

All of these axles are suitable for rerolling into various items, such as: Reinforcing Bars, Flats, Angles, Miscellaneous Shapes, Tie Plates, Angle Bars, et cetera.

**IRON & STEEL PRODUCTS, INC.**
13462 S. Brainard Avenue
Chicago 33, Illinois
*"ANYTHING containing IRON or STEEL"*

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DROP FORGE SUPERINTENDENT

35 years' experience in all phases of forging operations. Boards to 7500 Stearns to 15,000 Upsetters to 7½ inch. Capable of managing small plant. Reply Box 366, STEEL, Penton Bldg., Cleveland 13, Ohio.

**WANTED**
Light Gauge Slitting Line
Also Payoff and Recoiling Reels
16" I.D. and 36" to 48" O.D.
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ESCO for ALLOY AVAILABILITY

- HASTELLOY B & C
- ALLOY 20
- INCONEL
- MONEL
- PRECIPITATION HARDENING GRADES
- 0.03 MAX. CARBON

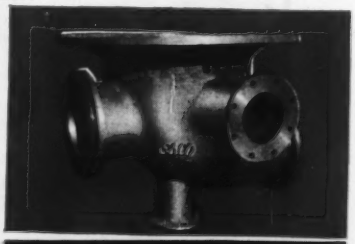
YOU GET FAST DELIVERY... even on small orders of special alloys...

Hastelloy B & C, Monel, Inconel, Alloy 20, 0.03 Max. Carbon, Precipitation Hardening Grades are just a few examples of alloys that are available—fast—when you need them. No waiting for long runs of standard production items to be completed before your order can be started. Big orders can be handled efficiently and economically too. A complete metallurgical laboratory enables *ESCO* to take advantage of the latest technological advances. Result: Outstanding quality control on every order.

UNUSUAL SHAPES AND SIZES ARE NO PROBLEM EITHER...

*ESCO* can supply you with static or centrifugal castings in wall sections and dimensions to meet your most exacting requirement. *ESCO* Shellcast is available, too, where needed.

Ask for details or write for free booklets..."How to cut Costs With *ESCO* Spuncast ®"... and "*ESCO* Stainless and High Alloy Products for the Process Industries".



specialists in high alloy steels

ESCO
HIGH ALLOY DIVISION

ELECTRIC STEEL FOUNDRY CO.

**Manufacturing Plants**
2160 N.W. 25th Ave.
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Danville, Illinois

***ESCO* International and New York Office**
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Seattle, Spokane, Wash.
Centralia, Pa.
Houston, Texas
Eugene, Ore.
Salt Lake City, Utah
Honolulu, Hawaii
In Canada, Vancouver, British Columbia and Toronto, Ontario.

county, Pa.; bids Feb. 24.
130 tons, state bridge work, Union county, Pa.; bids Feb. 24.
100 tons or more, miscellaneous steel items, Wahluke siphon project, Washington state.

## REINFORCING BARS . . .

### REINFORCING BARS PLACED

2000 tons, state highway bridges, Manatee county, Florida, to Florida Steel Products Co., Jacksonville, Fla.; Hardaway Contracting Co., Columbus, Ga., general contractor.
1700 tons, flood control, Project 4, Adams, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Massachusetts Northern Construction Co., Lawrence, Mass., general contractor.
450 tons, barracks, naval station, Newport, R. I., to Plantations Steel Co., Providence, R. I.; John A. Volpe Construction Co., Malden, Mass., general contractor.
250 tons, Puget Sound Power & Light Co., office headquarters, Bellevue, Wash., to Soule Steel Co., Seattle; Cawdrey & Vemo, Seattle, general contractor.
220 tons, high school, Littleton, Mass., to Joseph T. Ryerson & Son Inc., Boston; Tornabene Bros. Co., Newton Upper Falls, Mass., general contractor.
180 tons, Federal Reserve Bank building, Louisville, Ky., to American Builders Supply Co., Louisville; F. W. Owens Co., Louisville, general contractor.
140 tons, Supreme Court building, New Orleans, to Southwest Steel Products Co., New Orleans; R. P. Farnsworth & Co. Inc., New Orleans, general contractor.

### REINFORCING BARS PENDING

5800 tons, Wahluke siphon project, Washington state; bids to the Bureau of Reclamation, Ephrata, Wash., Mar. 13; DC-4620.
400 tons, four guided missile installations, near Fairchild Air Base, Spokane, Wash.; bids to U. S. Engineer, Seattle, Mar. 7.
130 tons, Washington state girder bridge, Thurston county; bids to Olympia, Wash., Feb. 21.
120 tons, Washington state girder bridge, Thurston county; bids to Olympia, Wash., Feb. 14.
90 tons, Washington state span, King county; bids to Olympia, Wash., Feb. 14.

## PLATES . . .

### PLATES PENDING

1350 tons, plates and liner plates, Wahluke siphon project, Washington state; bids to Bureau of Reclamation, Ephrata, Wash., Mar. 13.
105 tons, plates and sheets, class B, grade 2, arsenal, Watertown, Mass.; bids Feb. 20.
100 tons, also shapes, 90-ft car ferry, for the Alaska Road Commission; bids to William Garden, naval architect, Seattle, Feb. 26.

## PIPE . . .

### CAST IRON PIPE PLACED

940 tons, 6 to 12 in., to Pacific States Cast Iron Pipe Co., Portland, Oreg., by Spokane, Wash.

### CAST IRON PIPE PENDING

331 tons, various sizes, Portland, Oreg.; bids in.
131 tons, 12 in.; bids to Clerk E. H. T. McGowan, Bremerton, Wash., Feb. 8.

## RAILS, CARS . . .

### LOCOMOTIVES PLACED

Louisville & Nashville, 56 diesel units, 28 going to the Electro-Motive Division, General Motors Corp., La Grange, Ill., and 28 to Alco Products Inc. and General Electric Co., Schenectady, N. Y.
New York, New Haven & Hartford, 120 diesel-electric units, ninety 1750-hp units going to the Electro-Motive Division, General Motors Corp., La Grange, Ill., and fifteen 1800-hp units to Alco Products Inc., Schenectady, N. Y., and fifteen 1600-hp units to Fairbanks, Morse & Co., Chicago.
Norfolk & Western, 50 diesel-electric units, thirty-three 1750-hp units going to Electro-Motive Division, General Motors Corp., La Grange, Ill., and seventeen 1800-hp units to Alco Products Inc., Schenectady, N. Y.

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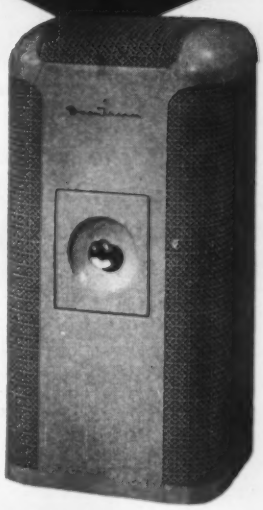
DUO-THERM selects H&K MORESQUE PATTERN PERFORATIONS to combine

- Heating Efficiency
- Maximum Strength
- Smart Design
- Cleanliness



The metal casing for this Duo-Therm Radiant Circulator was perforated by Harrington & King. H & K can supply perforated materials — with round holes, square holes, slots, ornamental patterns, oblong holes, oval holes — the pattern "just right" for your product. We will be glad to work with you on your perforating requirements.

Harrington & King's Moresque Pattern . . . one of thousands of patterns available for perforating metals for your products. For full range of H & K patterns, fill in and mail coupon to office and warehouse nearest you.

THE Harrington & King PERFORATING CO.

Chicago Office and Warehouse
5627 Fillmore Street
Chicago 44, Ill.

New York Office and Warehouse
114 Liberty Street
New York 6, N. Y.

Please send me—

- ☐ GENERAL CATALOG NO. 62
- ☐ STOCK LIST of Perforated Steel Sheets
- ☐ SAMPLES of Perforated Plastics and Paper
- ☐ PRICE INFORMATION (NOTE: Send specifications of perforated materials wanted. If necessary send drawings or sketches.)

NAME_____

TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

# Withstands far greater

# SHOCK LOADS

## than any standard V-belt

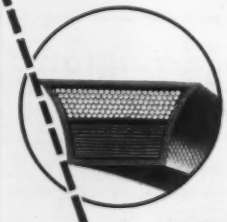
**Here are the interesting reasons why Gates Super Vulco Ropes stand up months, even years longer than *any* standard V-belts...**

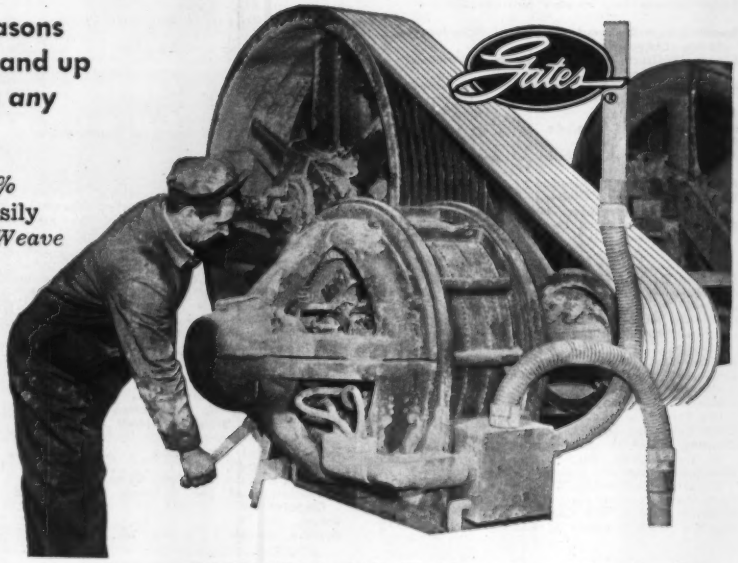
**1.** *Super-Strength Cords* provide 40% greater horsepower capacity . . . easily absorb heavy shock loads. **2.** *Flex-Weave Cover* (U.S. Pat. No. 2519590) provides greater flexibility with far less stress on the fabric. Cover wears longer — increases belt life, lowers belt costs.

**3.** *Concave Sidewalls* (U.S. Pat. No. 1813698) provides sure pulling power, longer wear because sides straighten out as belt bends—make even contact with sheave walls.

Straight-sided belts bulge out when bent around sheave

Uneven contact causes uneven wear.






SHOCK LOAD of this big jaw crusher at Canadian Quarries, Ltd. is absorbed by Gates Super Vulco Rope Drive. Wherever shock load is severe, Gates Super Vulco Ropes cushion the shock—keep machinery replacement cost down.

### *3 other outstanding advantages*

**Resists Oil, Heat and Weather:** Long life is assured even in the presence of excessive oil . . . even under prolonged exposure to heat and weather.

**Provides Static Safety:** The high electrical conductivity of Gates Super Vulco Rope provides safer drives in explosive atmosphere.

**Saves Space:** Higher horsepower rating and greater resiliency may permit fewer belts, or smaller sheaves where space saving is vitally important.

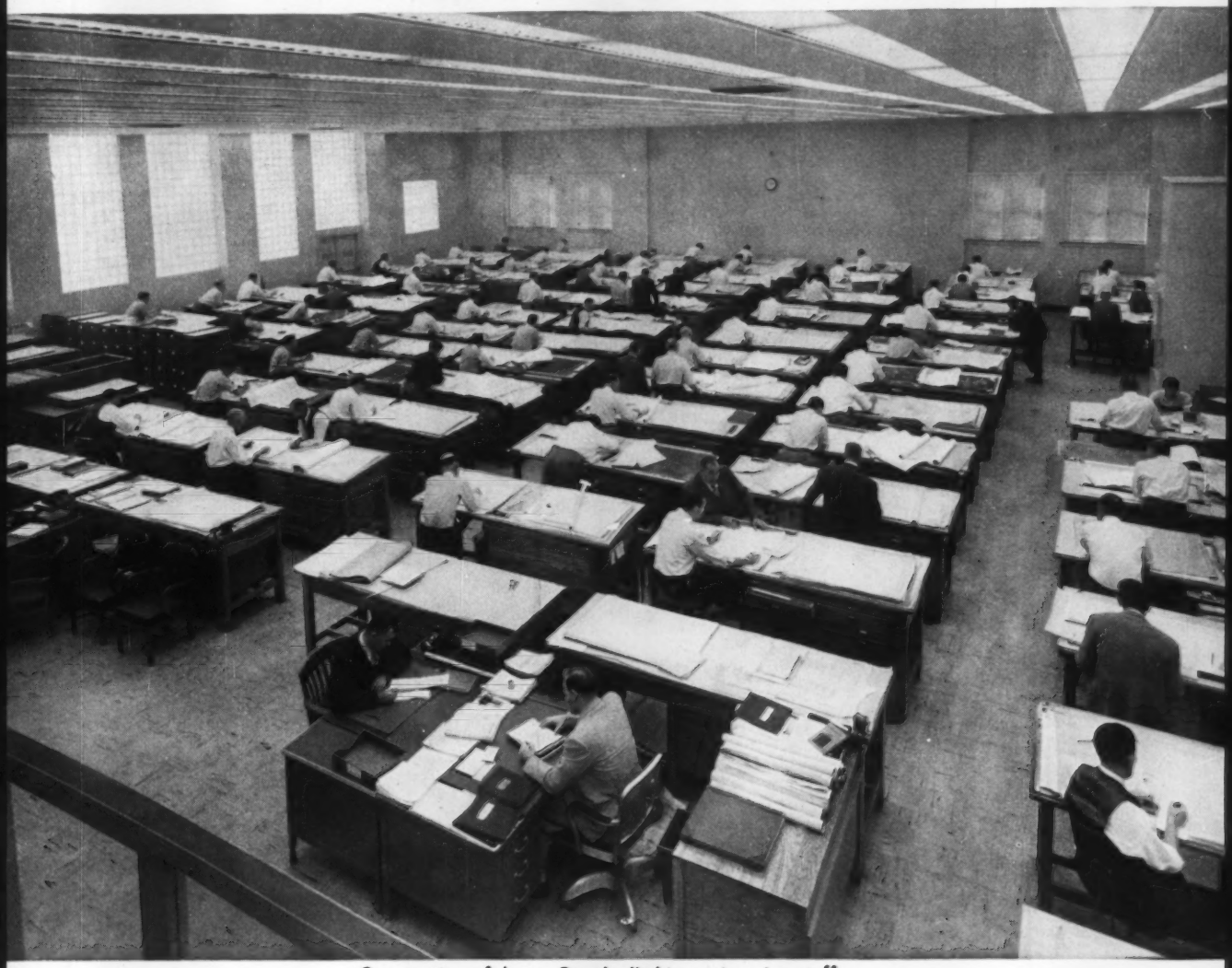
The Gates Rubber Co., Denver, Colorado
*World's Largest Maker of V-Belts*

# Gates SUPER Vulco Rope

## *The V-Belt with 40% more horsepower capacity*

TPA 57

54 YEARS OF DESIGNING AND BUILDING EQUIPMENT



One section of Aetna-Standard's big engineering staff

# men at work for ONE PURPOSE

To develop better equipment and more efficient equipment for production of steel, copper, brass, aluminum, in the form of higher quality pipe and tubing, tin plate, galvanized sheet and strip, cold drawn bars and tubes and many other products.

These engineering **idea men** have one purpose — to transform ideas into equipment as exemplified by the Rotary Hot Saw, the Tube Expander, the 5-Draw Drawbench and many ideas of Continuous Galvanizing, Continuous Electrolytic Tinning and Finishing Equipment.

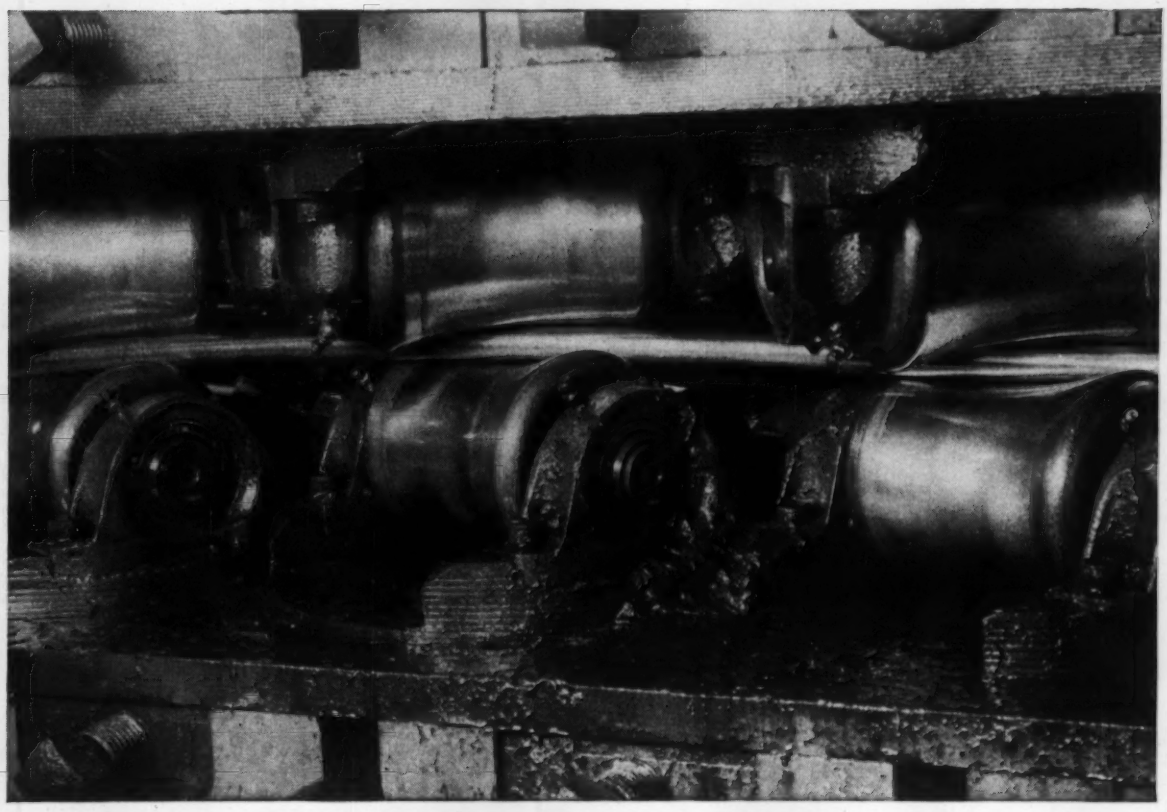
They do not work alone. Many of the ideas for new equipment originate with you, the customer. The Aetna engineering idea staff refines and develops the idea into equipment. This ability to work with customers is one of Aetna's best assets. . . . That's why Aetna-Standard always has been known as **the idea people.**

# AETNA • STANDARD

**THE AETNA-STANDARD ENGINEERING COMPANY**

GENERAL OFFICES: PITTSBURGH, PA. PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC



# Uses tool steel that outwears others 3 to 1 for its straightener rolls

TO help its customers get the longest possible life out of the rolls used in its small tube straighteners, Mackintosh-Hemphill Division of E. W. Bliss Co. makes them from Graph-Mo® steel.

Graph-Mo contains millions of tiny particles of diamond-hard carbides. As a result, users report it outwears other tool steels on an average of three to one!

Graph-Mo steel also contains free graphite which gives it outstanding anti-friction properties, prevents pick up and scoring. This is a big advantage to users of small Mack-Hemp straighteners because it results in a better surface on the products being processed. What's more it eliminates chrome plating the rolls, which is usually necessary when the straighteners are used for non-ferrous metals such as brass.

Graph-Mo steel gives Mackintosh-Hemphill two other important manufacturing advantages. It saves machining time because it's 30% easier to machine than ordinary tool steels. And it simplifies heat treating because of its uniform response to heat treatment.

Graph-Mo is one of four graphitic tool steels developed by the Timken Company. If you want more information about their use in dies, punches, gages and machine parts, write for the new Timken Graphitic Steel Data Book. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING